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# Savannah River Site Annual Meteorology Report for 2006 (U)

Washington Savannah River Company
Savannah River Site
Aiken, SC 29808

Prepared for the U. S. Department of Energy under contract no. DE-AC09-96SR18500

**Disclaimer**

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## Overview

Summaries of meteorological observations collected at the Savannah River Site in 2006 depict a year that overall was cooler and much drier than average. Annual rainfall for 2006 was 10.29 inches less than the most recent 30-year average, which ranks as the fourth driest year since 1952. March's total rainfall of 1.76 inches was the fifth lowest in the 54 years of record; conversely, the monthly rainfall in June, 6.89 inches, was the ninth highest on record. The largest daily rainfall of 3.30 inches was due to the remnants of Tropical Storm Alberto moving over the SRS on June 14. Rainfall of 0.01 inches or more occurred on 93 days during the year.

The annual average temperature for 2006, 63.8°F, was the 12th ***coldest*** of any year in a record that dates to 1968. Conditions were cooler than average in 8 of the 12 months of the year. Below average temperatures were particularly prevalent during the late summer and fall. October's average temperature of 62.4°F was the sixth coldest on record. The coldest temperature of the year was 18.4°F on the morning of December 9; the warmest temperature was 99.9°F on the afternoon of July 15.

Several significant wind events occurred during the winter and early spring of the year. The highest measured ground-level wind speed (gust), 43.4 miles per hour (mph), was associated with a strong thunderstorm complex moving over SRS during the day on May 19th. A tight pressure gradient from a strong low pressure area over the Northeast U.S. produced the highest daily average wind speed of 21.7 mph on January 14.

The most notable weather 'events' of 2006 were the formation of a weak El Niño in the late summer, lasting through the end of the year, and the below normal hurricane season. After beginning the year under a weak La Niña, July was accompanied by weak El Niño conditions, which increased to a moderate El Niño by years end. The effects of El Niño were felt during the 2006 tropical season. After a record setting 2005 season, 2006 saw only five hurricanes and four tropical storms, with only two tropical storms (Alberto and Ernesto) making landfall in the U.S (NOAA 2006e).

## Background

### *The General SRS Climate*

The Savannah River Site region has a humid subtropical climate characterized by relatively short, mild winters and long, warm, and humid summers (Oliver and Fairbridge, 1987).

Summer-like conditions typically last from May through September, when the area is frequently under the influence of a western extension in 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. Scattered afternoon and evening thunderstorms are common.

The influence of the Bermuda high begins to diminish during the fall as continental air masses become more prevalent, resulting in lower humidity and more moderate temperatures. Average rainfall during the fall is usually the least of the four seasons.

In the winter months, mid-latitude low pressure systems and associated fronts often migrate through the region. As a result, conditions frequently alternate between warm, moist, subtropical air from the Gulf of Mexico region and cool, dry polar air. The Appalachian Mountains to the north and northwest of the SRS help to moderate the extremely cold temperatures that are associated with occasional outbreaks of Arctic air. Consequently, less than one-third of winter days have minimum temperatures below freezing on average, and days with temperatures below 20°F are infrequent. Measurable snowfall occurs an average of once every 2 years.

Tornadoes occur more frequently in spring than the other seasons of the year. Although spring weather is somewhat windy, temperatures are usually mild and humidity is relatively low.

### *Overview of the Savannah River Site Meteorological Monitoring Program*

Meteorological data are collected at SRS from a network of nine primary monitoring stations (Fig. 1). Towers located adjacent to each of eight operations areas (A, C, D, F, H, K, L, and P areas) are equipped to measure wind direction, wind speed, temperature, and dew point at a height of 61 meters (m) above ground. Temperature and dew point are also measured at 2m. A ninth tower near N-Area, known as the Central Climatology site (CLM), is instrumented with wind, temperature, and dew point sensors at four levels: 2m (4m for wind), 18m, 36m, and 61m. The CLM site is also equipped with an automated tipping bucket rain gauge, a barometric pressure sensor, and a solar radiometer near the tower at ground level. Data acquisition units at each station record a measurement from each instrument at 1-second intervals. Every 15 minutes, 900 data points are processed to generate statistical summaries for each variable, including averages and instantaneous maxima, and the results are uploaded to a relational database for permanent archival. All aspects of the meteorological data collection program meet or exceed applicable regulatory criteria. Parker and Addis (1993) provide a complete description of the meteorological monitoring program at SRS.

Quality assurance of the data is conducted in two phases: an initial screening of recent data, followed by an in-depth review and

final quality classification. The initial screening, performed twice daily by qualified instrument technicians, consists of a thorough examination of 15-minute data retrieved from the database, in conjunction with a summary of instrument diagnostics obtained from the local data acquisition units. Potential problems are noted in a daily checksheet and, as needed, data acquisition unit software is configured to assign a quality control tag to data collected from the questionable instruments. Quality flags are also set during periods of calibration and maintenance.

The second phase of the quality assurance process is conducted according to formal procedure (SRNL, 2004). Daily checksheets generated during the initial screening, tower-specific logbook entries, initial quality flags, and time series plots of related data are reviewed to determine a final quality status for each record. All records permanently archived in the data base are identified as good, fatal, intermittent, biased, or uncalibrated.

### *Tall Tower Monitoring System*

ATG's Tall Tower facility near Beech Island, SC provides a set of high-quality meteorological measurements that is unique to the southeast U.S. This facility utilizes fast-response sonic anemometers, water vapor sensors, and barometric pressure sensors, and slow-response temperature sensors and relative humidity sensors. Data are collected at 30m, 61m, and 304m above ground level. Spread-spectrum modems at each measurement level transmit raw data to a redundant set of PCs at the Savannah River National Laboratory (SRNL). Data processing software on the PCs determine mean values and other statistical quantities every 15 minutes and uploads the results to the relational database.

### *Additional Measurements*

Additional precipitation measurements are collected from a network of 12 plastic wedge rain gauges across the SRS (See Fig. 1). These gauges are read manually by security or operations personnel once per day, usually around 6 am. The daily data are reported to the SRNL Atmospheric Technologies Center, reviewed to correct obvious flaws, and manually entered into a permanent electronic data base.

Additional measurements of temperature and relative humidity are recorded from a weather station located in A-Area, adjacent to SRNL. This station consists of a standard National Weather Service 'cotton region' instrument shelter. Data collected from this station are manually tabulated for archival as daily high and low values of temperature and relative humidity. Tabulated values are then entered into a permanent electronic data base.

## Data Sources for the 2006 Report

Summaries provided with this report are based on the following sources of data:

- Ground level (surface) measurements of *temperature (2m)*, *dew point temperature (2m)*, *wind speed (4m)*, *precipitation*, *barometric pressure*, and *solar radiation* from CLM, as well as meteorological quantities derived from these primary data, such as *relative humidity* (temperature and dew point), *wet bulb temperature* (temperature and dew point), *wet bulb globe temperature* (temperature, dew point, wind speed, and solar radiation), and *cooling/heating degree days* (temperature).

- Wind speed and direction from measurements collected at each of the four levels of the CLM tower and the 61m level of the eight area towers.

- Precipitation from the network of manually-read rain gauges

A series of SAS System® software routines were used to extract the desired data sets from the data base and perform initial statistical processing on all records with a QA status of 'good'. More than 99% of the data used in this report met this QA classification in 2006.

Output from the initial processing was then imported into an Excel® spreadsheet to generate the final summaries that are presented in the report.

Long-term climatological records are available for temperature, precipitation, and relative humidity. Statistics generated from these data are used for comparisons with the 2006 summaries.

Available records of SRS temperature and relative humidity begin in 1968. From 1968 through 1995, the climatological statistics used in this report are based on the daily maxima and minima recorded at the SRNL instrument shelter. After 1995, these statistics are based on measurements from the 2m level of CLM.

Precipitation data are available from 1952. For the period 1952 through 1995, statistics presented in the report are based on daily observations from the SRNL rain gauge. Summaries after 1995 are based on data collected from the CLM rain gauge.

## Climatology of the SRS for 2006

### *Highlights*

Meteorological data summaries for 2006 depict a year that was cooler and much drier than long-term averages. The annual average temperature of 63.8°F was the 12th coldest of any year in the available record. Relatively cool weather was particularly prevalent during the late summer and fall months. Annual rainfall for 2006 was 10.29 inches less than the most recent 30-year average, which made it the fourth driest year on record. Rainfall was well above average in June and December; conversely, March 2006 was the fifth driest of any March on record. A summary plot of daily observations of temperature, precipitation, relative humidity, and wind speed is given in Figure 2.

Seasonal climatological discussions published by the National Weather Service, Climate Prediction Center (CPC), and the National Centers for Environmental Prediction (NCEP)(NOAA 2006b, 2006c, 2006d, and 2006e), suggest that the relatively warm weather observed during January was the result of anomalous mid-level heights (heights higher than normal) over eastern Canada. This resulted in zonal (westerly) mid-level flow across much of North America, and near-record warmth over much of the United States. These conditions were consistent with those expected during weak La Niña periods. By April, the La Niña faded to a near neutral ENSO (El Niño/Southern Oscillation), which resulted in a shift of the persistent surface high pressure from eastern Canada to the central United States. This resulting shift produced below-normal precipitation from the Southwest U.S., through the Gulf Coast, and reaching into the mid-Atlantic states.

During June, an area of high pressure began to build over the western United States. As a result, a trough developed over the eastern U.S. causing a shift in the storm track, and leading to above-normal rainfall at SRS. An El Niño began to develop toward the end of summer, creating conditions at SRS of near normal or below-normal temperatures from September through November, and near or above-normal rainfall in November and December.

### *Temperature*

Monthly average, annual average and daily extreme temperatures for 2006 are summarized in Table 1(a). Similar statistics for a 30-year climatological reference period (1976-2005) are given in Table 2. A plot of observed daily high and low temperatures for 2006 is shown in Fig. 3. Plots of annual average temperature, monthly average daily high and low temperature, and days exceeding significant temperature thresholds (<32°F, >90°F) for 2006 and the 30-year reference period are shown in Figures 4, 5, and 6, respectively.

The annual average temperature for 2006, 63.8°F, was 0.6 degrees below the 30-year climatological average. Monthly average temperatures were below climatological averages for all months of the year except January, April, August, and December. Furthermore, average temperatures for May, June, September, October, and November ranked among the ten coldest on record for those months. Temperatures above 90°F were observed on 63 days during the year and around 70% of total days in July and August. Temperature extremes ranged from 18.4°F on December 9 to 99.9°F on July 15. Daily low temperature records were set on March 25

and 26, May 2 and 13, June 7, July 9, and December 9. A daily high temperature record was set on June 11.

Monthly and annual total heating and cooling degree days (based on a reference temperature of 65°F) are summarized in Table 1(c).

The last spring killing freeze (temperature <28°F) date was February 14, with the first fall killing freeze of December 5. March 27 was the last frost date (temperature <32°F) of the spring, and October 24 was the first frost date of the fall.

***Precipitation***

Annual, monthly, and daily rainfall statistics for 2006 are summarized in Table 1(a). Monthly and annual totals for the previous 30-years (1976-2005) are given in Table 3. Monthly and annual rainfall totals for the 12 manually read gauges across the SRS are summarized in Table 4. A plot of daily totals (midnight to midnight) for the CLM site for 2006 is shown as Figure 7. A comparison of annual and monthly rainfall for 2006 and the 30-year climatological reference period are shown in Figures 8 and 9, respectively.

Total precipitation at the CLM site, 38.28 inches, was 10.29 inches less than the 30-year average, making it the fourth driest year on record. The monthly total of 1.76 inches for March was the fifth lowest on record for the month. Conversely, June's total of 6.89 inches was the ninth highest on record. The heavy rain that occurred on June 14 (3.30 in) was due to the remnants of Tropical Storm Alberto moving slowly through the Southeast.

Measurable precipitation (>0.01 inch) occurred on 93 days and rainfall greater than 0.5 inch occurred on 23 days.

***Atmospheric Moisture***

Monthly average, annual average, and daily extreme dew point temperature, wet bulb temperature, and relative humidity for 2006 are summarized in Table 1(b). This table also presents monthly and annual averages of the daily maximum and minimum humidity. A plot of daily observed values of maximum and minimum humidity for 2006 is shown in Figure 10. Plots of annual and monthly averages of humidity for 2006 and the 30-year climatological reference period (1976-2005) are shown in Figures 11 and 12, respectively.

Average relative humidity for 2006 was 65 percent (%) with an average daily minimum of 41% and an average daily maximum of 85%. Days with relative humidity of 20% or less occurred in January, February, March, April, May, and December. The lowest relative humidity recorded during the year was 13% on April 5. Average daily minimum relative humidity was less than long-term values for the entire year.

Observed dew point temperatures ranged from a maximum of 79.0°F on August 29 to a minimum of 7.1°F on December 8. Wet bulb temperature ranged from a maximum of 80.9°F on August 4 to a minimum of 17.2°F on December 9.

***Heat Stress***

Restrictions on outdoor work due to excessive heat are based on values of the wet bulb globe temperature (WBGT) (WSRC, 1995). Hunter and Minyard (2000) provide a description of WBGT and the method used at SRS to calculate WBGT from standard meteorological measurements at CLM.

Monthly and annual maximum WBGT and statistics on heat stress category days for 2006 is summarized in Table 1(b). The highest WBGT for 2006 was 93.9°F on August 4. Heat stress Category 5 (WBGT >90.0°F) occurred on 20 days during the summer period. A total of 150 days reached at least Category 1 (WBGT > 77.0 °F) from March through November.

### *Wind*

Monthly average and extreme wind speed at the CLM 4 meter level for 2006 is summarized in Table 1(c). Daily averaged wind speed for the year is plotted in Figure 13. Figures 14(a) and 14(b) show wind rose plots depicting joint occurrence frequencies of wind speed category by wind direction sector at the 61 meter level of the eight area towers. Figure 15 provides wind rose plots for the 4 levels of measurement at CLM. Seasonal wind rose plots for 2006 for data from the 61m level of CLM are shown in Figure 16. Tables of the joint frequency data used to create the wind rose plots are given in Appendix A.

Monthly average wind speeds were highest in January and March, with monthly averages exceeding 4.5 mph. The highest instantaneous wind speed recorded at the 4m level, 43.4 mph, was associated with a strong thunderstorm complex moving over SRS during the day on May 19th. A tight pressure gradient from a strong low pressure area over the Northeast U.S. produced the highest daily average wind speed of 21.7 mph on January 14. Average wind speeds were generally the lowest during December.

Wind rose plots for the area towers show typical annual patterns for the 61 meter level. This pattern consists of higher frequencies of wind from the northeasterly sectors and the southwesterly to west sectors. Due to the location of the D area tower in the shallow valley formed by the Savannah River, winds are somewhat more frequently from the southeasterly and northwesterly sectors than for the other area towers. Wind roses for CLM also show typical variations in the frequency patterns by level, with progressively higher frequencies of southeasterly winds and lower frequencies of northeasterly and southwesterly winds nearer the ground. Weber (2003) provides a complete description of the wind climatology at the CLM site.

The seasonal wind roses show that higher frequencies of westerly wind occur in the winter and spring and a much higher frequency of northeasterly wind during the late summer and fall.

### *Barometric Pressure*

Annual and monthly average and extreme barometric pressure is summarized in Table 1(c). Daily average barometric pressure is plotted in Figure 17. The occurrence of lowest daily average and 15-minute minimum barometric pressure, 992.5 and 987.6 mb, respectively, were associated with the passage of a strong low pressure system through the area on November 16. The highest daily average and 15-minute maximum barometric pressure, 1023.6 and 1026.6 mb, respectively, were associated with a strong high pressure system that built over the mid-Atlantic region of the U. S. on January 27.

### *Solar Radiation*

Annual and monthly averages and extremes of daily total solar radiation are summarized in Table 1(c). This table also

provides monthly and annual values of the fraction of observed solar radiation relative to theoretical clear sky maxima. The monthly theoretical values were estimated from tables published by Budyko (1974). Daily total solar radiation for 2006 is plotted in Figure 18. The average daily values ranged from 209 langleys per day (ly/day) in December to 561 ly/day in June. The months of April, May, June, July, September, October, and November were relatively sunny with observed solar radiation greater than 70% of clear sky maximum. February and December were relatively cloudy with monthly average observed solar radiation only 61% and 63% of the clear sky maximum, respectively. Individual daily extremes ranged from 15 ly on February 11 to 698 ly on June 7.

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## Table 1(a) - Means and Extremes of SRS Meteorological Data for 2006

| Month | Temperatures ( °F) | | | | | | | | | | | | | Precipitation (in) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average | | | | | Extremes | | | | Number of Days | | | | | | | | | No. of Days | | |
| | Avg. Daily High | Avg. Daily Low | **Month Avg.** | ***Departure from 30yr avg*** | **Rank (1968-2006)** | Highest | High Date | Lowest | Low Date | Maximum Above 90 °F | Maximum Above 100 °F | Minimum Below 32 °F | Minimum Below 20 °F | **Total** | ***Departure from 30yr avg*** | **Rank (1952-2006)** | Greatest in 24 Hrs | Date of 24hr max | Greater Than 0.01 in. | Greater Than 0.1 in. | Greater Than 0.5 in. |
| **Jan** | 63.7 | 41.3 | **50.8** | ***+5.2*** | **8** | 74.5 | 21st | 23.3 | 7th | 0 | 0 | 7 | 0 | **3.38** | ***-0.90*** | **19** | 1.55 | 2nd | 13 | 6 | 2 |
| **Feb** | 58.3 | 37.7 | **47.3** | ***-2.5*** | **12** | 72.6 | 17th | 24.8 | 13th | 0 | 0 | 9 | 0 | **2.90** | ***-1.31*** | **17** | 0.90 | 26th | 8 | 6 | 2 |
| **Mar** | 67.0 | 44.0 | **55.3** | ***-1.6*** | **12** | 83.8 | 12th | 28.2 | 26th | 0 | 0 | 5 | 0 | **1.76** | ***-2.94*** | **5** | 1.40 | 21st | 4 | 3 | 1 |
| **Apr** | 79.5 | 54.1 | **66.3** | ***+2.1*** | **12** | 88.7 | 15th | 37.6 | 5th | 0 | 0 | 0 | 0 | **2.41** | ***-0.73*** | **17** | 0.68 | 8th | 5 | 5 | 2 |
| **May** | 82.2 | 59.2 | **70.1** | ***-1.0*** | **8** | 95.3 | 27th | 45.1 | 2nd | 8 | 0 | 0 | 0 | **1.83** | ***-1.64*** | **12** | 0.79 | 14th | 9 | 5 | 1 |
| **Jun** | 87.4 | 66.0 | **76.1** | ***-2.1*** | **9** | 96.3 | 11th | 54.0 | 6th | 8 | 0 | 0 | 0 | **6.89** | ***+1.94*** | **9** | 3.30 | 14th | 8 | 7 | 3 |
| **Jul** | 92.4 | 69.8 | **80.3** | ***-1.1*** | **14** | 99.9 | 15th | 58.9 | 9th | 23 | 0 | 0 | 0 | **5.22** | ***-0.18*** | **24** | 2.76 | 22nd | 10 | 5 | 2 |
| **Aug** | 91.4 | 72.1 | **80.4** | ***+0.3*** | **15** | 98.9 | 4th | 67.0 | 13th | 21 | 0 | 0 | 0 | **2.19** | ***-2.59*** | **7** | 1.27 | 11th | 6 | 6 | 1 |
| **Sep** | 83.5 | 64.3 | **72.9** | ***-2.2*** | **8** | 91.4 | 3rd | 48.0 | 30th | 3 | 0 | 0 | 0 | **2.50** | ***-1.52*** | **13** | 1.59 | 13th | 8 | 4 | 1 |
| **Oct** | 74.5 | 52.2 | **62.4** | ***-2.6*** | **6** | 88.0 | 5th | 31.6 | 24th | 0 | 0 | 1 | 0 | **1.66** | ***-1.54*** | **21** | 0.79 | 22nd | 7 | 2 | 2 |
| **Nov** | 67.1 | 43.3 | **53.6** | ***-2.8*** | **10** | 79.7 | 10th | 29.6 | 4th | 0 | 0 | 1 | 0 | **2.98** | ***0.00*** | **18** | 1.06 | 16th | 8 | 7 | 4 |
| **Dec** | 63.6 | 40.9 | **50.6** | ***+2.5*** | **10** | 74.7 | 19th | 18.4 | 9th | 0 | 0 | 7 | 1 | **4.56** | ***+1.11*** | **11** | 1.93 | 22nd | 7 | 4 | 2 |
| **Year** | 76.0 | 53.8 | **63.8** | ***-0.6*** | **12** | 99.9 | 15-Jul | 18.4 | 9-Dec | 63 | 0 | 30 | 1 | **38.28** | ***-10.29*** | **4** | 3.30 | 14-Jun | 93 | 60 | 23 |

Rank by coolest | Rank by warmest | Rank by wettest | Rank by dryest

## Table 1(b) - Means and Extremes of SRS Meteorological Data for 2006

| Month | Dew Point Temperature ( °F) | | | | | Wet Bulb Temperature ( °F) | | | | | Relative Humidity (%) | | | | | Wet Bulb Globe Temperature ( °F) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | Number of Days | | | | |
| | Average | Highest | High Date | Lowest | Low Date | Average | Highest | High Date | Lowest | Low Date | Avg. Daily Maximum | Avg. Daily Minimum | Monthly | Lowest | Low Date | Highest | High Date | Cat 1 and Above | Cat 2 and Above | Cat 3 and Above | Cat 4 and Above | Cat 5 |
| Jan | **40.6** | 61.9 | 11th | 14.6 | 26th | **46.2** | 64.9 | 21st | 21.9 | 7th | **92** | **45** | 71 | 19 | 25th | 74.0 | 12th | 0 | 0 | 0 | 0 | 0 |
| Feb | **35.5** | 61.0 | 22nd | 13.8 | 27th | **42.2** | 62.8 | 22nd | 24.0 | 13th | **91** | **39** | 68 | 19 | 24th | 68.4 | 3rd | 0 | 0 | 0 | 0 | 0 |
| Mar | **39.0** | 63.4 | 14th | 14.6 | 15th | **47.6** | 67.6 | 12th | 27.4 | 26th | **86** | **35** | 59 | 16 | 14th | 80.5 | 12th | 2 | 0 | 0 | 0 | 0 |
| Apr | **50.5** | 67.4 | 23rd | 22.7 | 5th | **57.6** | 71.1 | 17th | 36.2 | 5th | **89** | **33** | 62 | 13 | 5th | 81.5 | 23rd | 11 | 0 | 0 | 0 | 0 |
| May | **55.1** | 68.3 | 26th | 25.4 | 1st | **61.2** | 75.2 | 27th | 42.7 | 2nd | **84** | **38** | 63 | 18 | 1st | 87.5 | 27th | 17 | 11 | 5 | 0 | 0 |
| Jun | **59.9** | 70.5 | 21st | 43.4 | 6th | **66.2** | 77.4 | 21st | 48.7 | 6th | **73** | **40** | 59 | 27 | 7th | 90.9 | 21st | 27 | 19 | 9 | 3 | 1 |
| Jul | **63.8** | 74.2 | 31st | 49.1 | 9th | **69.5** | 77.9 | 15th | 53.7 | 9th | **75** | **40** | 59 | 27 | 18th | 90.8 | 16th | 30 | 27 | 26 | 19 | 5 |
| Aug | **67.5** | 79.0 | 29th | 55.3 | 18th | **71.8** | 80.9 | 4th | 61.4 | 13th | **79** | **48** | 66 | 37 | 4th | 93.9 | 4th | 30 | 30 | 26 | 19 | 14 |
| Sep | **61.5** | 72.8 | 4th | 37.3 | 29th | **65.9** | 76.3 | 3rd | 45.7 | 30th | **88** | **45** | 70 | 26 | 29th | 87.7 | 4th | 24 | 9 | 5 | 0 | 0 |
| Oct | **48.9** | 68.0 | 18th | 26.6 | 15th | **55.2** | 71.1 | 18th | 30.7 | 24th | **86** | **40** | 65 | 20 | 15th | 81.6 | 5th | 8 | 0 | 0 | 0 | 0 |
| Nov | **42.6** | 65.7 | 16th | 18.5 | 4th | **48.8** | 67.1 | 16th | 27.3 | 4th | **86** | **45** | 69 | 22 | 4th | 80.1 | 15th | 1 | 0 | 0 | 0 | 0 |
| Dec | **40.1** | 67.2 | 1st | 7.1 | 8th | **45.8** | 67.9 | 1st | 17.2 | 9th | **88** | **44** | 70 | 20 | 9th | 72.1 | 1st | 0 | 0 | 0 | 0 | 0 |
| Year | **50.4** | 79.0 | 29-Aug | 7.1 | 8-Dec | **56.5** | 80.9 | 4-Aug | 17.2 | 9-Dec | **85** | **41** | 65 | 13 | 5-Apr | 93.9 | 4-Aug | 150 | 96 | 71 | 41 | 20 |

## Table 1(c) - Means and Extremes of SRS Meteorological Data for 2006 (cont'd)

| Month | Wind Speed (mph) | | | | Barometric Pressure (mb) | | | | | Solar Radiation (ly) | | | | | | Degree Days | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Monthly Average** | Max 15-min Average | Max Instantaneous | Date Max Inst. | **Average** | Lowest | Low Date | Highest | High Date | **Average Daily Total** | % of Theoretical Max | Minumum Daily Total | Date | Maximum Daily Total | Date | **Heating Degree Days** | Daily maximum | Date | **Cooling Degree Days** | Daily Maximum | Date |
| **Jan** | **4.6** | 21.7 | 40.6 | 14th | **1007.8** | 990.8 | 14th | 1026.6 | 27th | **236** | 0.66 | 23 | 22nd | 365 | 31st | **434** | 27 | 7th | **0** | 0 | |
| **Feb** | **4.4** | 17.0 | 34.5 | 4th | **1007.8** | 988.8 | 4th | 1019.2 | 19th | **276** | 0.61 | 15 | 11th | 458 | 26th | **496** | 30 | 13th | **0** | 0 | |
| **Mar** | **4.7** | 18.5 | 39.0 | 14th | **1007.6** | 995.8 | 21st | 1017.5 | 27th | **376** | 0.66 | 53 | 20th | 570 | 27th | **317** | 20 | 21st | **17** | 6 | 13th |
| **Apr** | **4.4** | 19.6 | 36.4 | 19th | **1004.8** | 991.8 | 17th | 1018.1 | 12th | **503** | 0.74 | 91 | 8th | 626 | 24th | **61** | 11 | 10th | **101** | 11 | 15th |
| **May** | **4.3** | 16.3 | 43.4 | 19th | **1001.3** | 992.4 | 18th | 1012.8 | 1st | **523** | 0.70 | 159 | 8th | 682 | 19th | **35** | 6 | 1st | **193** | 17 | 27th |
| **Jun** | **4.0** | 14.5 | 28.6 | 8th | **1004.3** | 992.1 | 14th | 1013.0 | 17th | **561** | 0.71 | 125 | 13th | 698 | 7th | **0** | 0 | | **342** | 18 | 11th |
| **Jul** | **3.7** | 15.3 | 41.7 | 22nd | **1007.2** | 998.8 | 22nd | 1013.8 | 2nd | **551** | 0.72 | 198 | 6th | 692 | 24th | **0** | 0 | | **473** | 20 | 15th |
| **Aug** | **3.6** | 10.1 | 28.0 | 11th | **1004.8** | 997.8 | 30th | 1011.7 | 7th | **482** | 0.68 | 112 | 12th | 638 | 2nd | **0** | 0 | | **479** | 21 | 3rd |
| **Sep** | **4.0** | 14.9 | 28.9 | 5th | **1004.7** | 996.9 | 28th | 1011.8 | 12th | **425** | 0.70 | 77 | 13th | 563 | 20th | **3** | 3 | 30th | **240** | 14 | 3rd |
| **Oct** | **4.2** | 17.3 | 29.6 | 28th | **1005.5** | 989.7 | 28th | 1015.0 | 3rd | **348** | 0.70 | 65 | 27th | 494 | 3rd | **152** | 21 | 25th | **70** | 9 | 20th |
| **Nov** | **4.0** | 13.6 | 31.4 | 16th | **1007.1** | 987.6 | 16th | 1022.5 | 4th | **278** | 0.70 | 56 | 22nd | 421 | 3rd | **343** | 24 | 21st | **2** | 2 | 30th |
| **Dec** | **3.3** | 15.3 | 30.1 | 7th | **1012.6** | 992.9 | 25th | 1025.6 | 9th | **209** | 0.63 | 17 | 22nd | 343 | 9th | **449** | 34 | 9th | **4** | 4 | 1st |
| **Year** | **4.1** | 21.7 | 43.4 | 19-May | **1006.3** | 987.6 | 16-Nov | 1026.6 | 27-Jan | **397** | 0.68 | 15 | 11-Feb | 698 | 7-Jun | **2291** | 34 | 9-Dec | **1921** | 21 | 3-Aug |

## Table 2. Monthly and Annual Average and Extreme Temperatures, 1976-2006

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 68.4 |
| 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 |
| 1996 | 44.6 | 50.1 | 50.6 | 61.6 | 72.9 | 76.5 | 79.3 | 76.0 | 72.7 | 62.1 | 51.6 | 48.8 | 62.2 |
| 1997 | 48.2 | 52.9 | 63.3 | 61.2 | 68.5 | 74.0 | 80.2 | 79.0 | 75.0 | 64.1 | 51.6 | 47.0 | 63.8 |
| 1998 | 49.7 | 51.1 | 53.6 | 62.7 | 74.6 | 82.1 | 82.6 | 80.3 | 75.8 | 66.9 | 60.5 | 53.6 | 66.1 |
| 1999 | 51.9 | 51.6 | 53.4 | 67.2 | 69.7 | 76.6 | 80.7 | 82.9 | 73.8 | 64.3 | 58.1 | 48.6 | 64.9 |
| 2000 | 44.4 | 50.2 | 58.5 | 60.7 | 75.1 | 78.0 | 79.9 | 77.6 | 71.7 | 62.5 | 53.1 | 38.2 | 62.5 |
| 2001 | 43.8 | 52.4 | 53.0 | 63.9 | 71.3 | 75.3 | 77.7 | 78.8 | 71.2 | 62.2 | 60.0 | 52.4 | 63.5 |
| 2002 | 47.3 | 48.0 | 57.6 | 68.1 | 70.2 | 77.5 | 80.5 | 78.4 | 75.4 | 66.7 | 51.7 | 44.5 | 63.8 |
| 2003 | 42.0 | 47.5 | 57.6 | 61.6 | 70.6 | 75.2 | 77.3 | 77.7 | 71.9 | 63.7 | 58.2 | 42.9 | 62.2 |
| 2004 | 43.7 | 45.2 | 58.5 | 63.4 | 74.0 | 77.7 | 80.1 | 77.3 | 73.2 | 66.2 | 56.1 | 45.8 | 63.4 |
| 2005 | 47.9 | 49.0 | 53.1 | 60.9 | 68.0 | 75.4 | 79.4 | 78.8 | 77.0 | 64.7 | 56.1 | 44.3 | 62.9 |
| 2006 | 50.8 | 47.3 | 55.3 | 66.3 | 70.1 | 76.2 | 80.3 | 80.5 | 72.9 | 62.4 | 53.6 | 50.6 | 63.8 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avg | 45.6 | 49.8 | 56.9 | 64.2 | 71.7 | 78.2 | 81.4 | 80.1 | 75.1 | 65.0 | 56.4 | 48.1 | 64.4 |
| Lowest Mon | 35.3 | 41.3 | 50.6 | 58.9 | 66.8 | 74.0 | 77.3 | 76.0 | 71.2 | 60.1 | 48.7 | 38.2 | 62.2 |
| Yr Lowest | 1977 | 1978 | 1971 | 1993 | 1983 | 1997 | 1967 | 1973 | 1973 | 1976 | 1976 | 2000 | 1996 |
| Rec Low | -3 | 10 | 11 | 29 | 38 | 48 | 56 | 56 | 41 | 28 | 18 | 5 | -3 |
| Yr Rec | 1985 | 1996 | 1980 | 1983 | 1989 | 1984 | 1963 | 1986 | 1967 | 1976 | 1970 | 1962 | 1985 |
| Highest Mon | 54.9 | 57.5 | 63.3 | 69.2 | 76.9 | 82.7 | 86.9 | 83.9 | 79.2 | 73.4 | 65.5 | 56.9 | 68.4 |
| Yr Highest | 1974 | 1990 | 1997 | 1991 | 1991 | 1986 | 1986 | 1983 | 1980 | 1984 | 1985 | 1971 | 1990 |
| Rec High | 86 | 86 | 90 | 99 | 102 | 105 | 107 | 107 | 104 | 96 | 89 | 82 | 107 |
| Yr Rec | 1975 | 1989 | 1974 | 1986 | 1963 | 1985 | 1986 | 1983 | 1990 | 1986 | 1987 | 1984 | 1986 |

## Table 3. Monthly and Annual Rainfall, 1976-2006

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 1.27 | 1.79 | 2.47 | 3.42 | 7.30 | 5.50 | 4.27 | 1.63 | 3.86 | 43.71 |
| 1978 | 10.02 | 1.31 | 3.06 | 3.53 | 3.64 | 3.42 | 4.11 | 5.10 | 4.06 | 0.06 | 3.54 | 1.87 | 43.72 |
| 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 | 3.96 | 5.79 | 0.54 | 2.81 | 1.00 | 9.55 | 47.54 |
| 1982 | 3.94 | 4.46 | 2.51 | 5.68 | 2.73 | 4.28 | 11.49 | 5.02 | 4.62 | 3.87 | 2.41 | 4.85 | 55.86 |
| 1983 | 3.75 | 7.22 | 6.62 | 5.77 | 1.67 | 6.57 | 4.85 | 6.32 | 3.56 | 1.92 | 5.39 | 4.15 | 57.79 |
| 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 | 6.92 | 1.31 | 0.84 | 1.70 | 4.62 | 8.10 | 4.38 | 0.49 | 6.34 | 6.36 | 2.48 | 46.55 |
| 1986 | 1.46 | 3.58 | 4.08 | 1.45 | 3.84 | 3.03 | 2.96 | 10.90 | 1.54 | 4.19 | 5.82 | 5.83 | 48.68 |
| 1987 | 7.39 | 7.55 | 4.97 | 0.70 | 3.57 | 5.64 | 4.87 | 4.93 | 3.56 | 0.29 | 2.74 | 1.42 | 47.63 |
| 1988 | 4.15 | 3.19 | 2.91 | 4.78 | 2.85 | 7.12 | 1.78 | 6.80 | 4.40 | 3.39 | 2.17 | 2.91 | 46.45 |
| 1989 | 1.42 | 3.59 | 5.52 | 4.89 | 2.60 | 6.67 | 11.46 | 3.27 | 4.87 | 3.36 | 3.00 | 4.41 | 55.06 |
| 1990 | 3.07 | 2.38 | 2.37 | 1.21 | 2.95 | 0.89 | 7.31 | 8.07 | 0.62 | 19.62 | 1.41 | 1.57 | 51.47 |
| 1991 | 7.03 | 1.84 | 7.89 | 4.73 | 3.06 | 2.17 | 7.89 | 9.26 | 4.40 | 0.99 | 1.55 | 3.32 | 54.13 |
| 1992 | 4.45 | 3.89 | 2.98 | 2.40 | 1.34 | 6.27 | 3.69 | 4.83 | 6.38 | 3.11 | 7.78 | 2.86 | 49.98 |
| 1993 | 7.45 | 3.62 | 8.37 | 1.74 | 1.43 | 3.27 | 3.12 | 2.23 | 7.29 | 0.99 | 1.87 | 1.81 | 43.19 |
| 1994 | 4.80 | 3.91 | 6.42 | 1.05 | 1.45 | 5.08 | 7.47 | 3.47 | 0.99 | 10.01 | 3.05 | 4.62 | 52.32 |
| 1995 | 6.96 | 7.97 | 0.92 | 1.28 | 1.77 | 8.15 | 5.71 | 6.92 | 5.75 | 2.64 | 2.38 | 4.47 | 54.92 |
| 1996 | 3.65 | 2.43 | 6.64 | 2.40 | 2.96 | 3.04 | 5.57 | 6.91 | 3.67 | 2.16 | 2.32 | 3.20 | 44.95 |
| 1997 | 4.20 | 5.45 | 2.69 | 4.38 | 2.38 | 6.90 | 7.09 | 2.01 | 4.89 | 4.08 | 5.51 | 9.09 | 58.67 |
| 1998 | 7.73 | 8.90 | 6.69 | 7.35 | 4.05 | 4.65 | 5.27 | 2.88 | 4.81 | 0.78 | 0.82 | 1.80 | 55.73 |
| 1999 | 5.31 | 2.29 | 3.44 | 1.95 | 1.26 | 7.52 | 4.91 | 3.14 | 4.46 | 2.57 | 1.50 | 1.21 | 39.56 |
| 2000 | 5.77 | 0.73 | 3.95 | 1.34 | 1.36 | 4.74 | 2.47 | 4.49 | 7.70 | 0.02 | 3.50 | 1.53 | 37.60 |
| 2001 | 3.11 | 2.68 | 7.21 | 1.28 | 3.85 | 6.49 | 4.79 | 3.55 | 3.33 | 0.50 | 1.03 | 0.54 | 38.36 |
| 2002 | 2.85 | 2.13 | 3.86 | 2.58 | 1.69 | 2.30 | 5.95 | 5.47 | 3.45 | 3.19 | 4.00 | 3.58 | 41.05 |
| 2003 | 1.73 | 5.00 | 7.09 | 8.43 | 5.57 | 10.99 | 8.91 | 4.59 | 2.70 | 3.03 | 1.21 | 1.93 | 61.18 |
| 2004 | 2.85 | 6.71 | 0.81 | 1.34 | 3.45 | 6.41 | 1.23 | 2.96 | 10.26 | 1.02 | 3.17 | 2.69 | 42.90 |
| 2005 | 2.14 | 3.89 | 6.09 | 1.69 | 2.87 | 8.23 | 5.81 | 4.08 | 0.19 | 3.60 | 2.67 | 6.16 | 47.42 |
| 2006 | 3.38 | 2.90 | 1.76 | 2.41 | 1.83 | 6.89 | 5.22 | 2.19 | 2.50 | 1.66 | 2.98 | 4.56 | 38.28 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avg | 4.28 | 4.21 | 4.70 | 3.14 | 3.47 | 4.95 | 5.40 | 4.78 | 4.02 | 3.20 | 2.98 | 3.45 | 48.57 |
| Min | 0.89 | 0.73 | 0.81 | 0.70 | 1.31 | 0.89 | 0.90 | 1.04 | 0.19 | 0.02 | 0.21 | 0.46 | 28.82 |
| Yr Min | 1981 | 2000 | 2004 | 1972 | 1965 | 1990 | 1980 | 1963 | 2005 | 2000 | 1958 | 1955 | 1954 |
| Max | 10.02 | 8.90 | 10.96 | 8.43 | 10.90 | 10.99 | 11.49 | 10.90 | 10.26 | 19.62 | 7.78 | 9.55 | 73.47 |
| Yr Max | 1978 | 1998 | 1980 | 2003 | 1976 | 2003 | 1982 | 1964 | 2004 | 1990 | 1992 | 1997 | 1964 |

**Table 4 - SRS Rainfall (in inches) for 2006, Manual Gauges**

| Month | 700-A | Barricade 2 | Barricade 3 | Barricade 5 | 100-C | 400-D | 200-F | 200-H | 100-K | 100-L | 100-P | SRNL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Jan** | 3.06 | 3.19 | 3.84 | 2.42 | 3.25 | 3.19 | 3.47 | 3.48 | 3.93 | 3.36 | 3.85 | 2.94 |
| **Feb** | 2.69 | 2.93 | 3.11 | 3.40 | 2.84 | 2.61 | 3.37 | 3.48 | 3.05 | 2.93 | 3.15 | 2.83 |
| **Mar** | 2.97 | 3.01 | 2.66 | 1.06 | 1.38 | 1.35 | 2.45 | 2.23 | 2.06 | 1.31 | 1.29 | 2.90 |
| **Apr** | 3.00 | 2.73 | 2.94 | 2.81 | 2.47 | 2.29 | 3.22 | 4.89 | 2.46 | 2.41 | 2.29 | 2.98 |
| **May** | 1.66 | 2.09 | 1.34 | 1.21 | 2.36 | 2.34 | 1.53 | 1.60 | 2.08 | 2.26 | 2.39 | 1.60 |
| **Jun** | 5.28 | 9.43 | 7.47 | 8.41 | 7.21 | 6.00 | 7.73 | 8.95 | 6.35 | 7.27 | 8.18 | 7.23 |
| **Jul** | 2.39 | 1.96 | 4.55 | 7.75 | 3.84 | 5.26 | 5.88 | 5.48 | 5.35 | 5.99 | 6.19 | 2.59 |
| **Aug** | 2.35 | 3.70 | 4.82 | 3.65 | 1.92 | 1.59 | 1.49 | 2.99 | 1.92 | 1.69 | 1.31 | 2.54 |
| **Sep** | 2.31 | 3.33 | 4.60 | 3.76 | 2.33 | 2.81 | 2.34 | 2.16 | 2.79 | 3.15 | 2.69 | 2.43 |
| **Oct** | 3.48 | 2.56 | 2.81 | 1.66 | 2.88 | 1.77 | 2.53 | 1.43 | 1.72 | 3.11 | 3.25 | 3.48 |
| **Nov** | 2.55 | 3.24 | 3.09 | 2.99 | 3.36 | 3.76 | 3.25 | 3.20 | 3.14 | 3.27 | 3.08 | 2.61 |
| **Dec** | 2.70 | 4.09 | 3.91 | 4.28 | 3.77 | 4.40 | 5.12 | 4.85 | 5.29 | 4.67 | 4.49 | 5.03 |
| **Annual** | **34.44** | **42.26** | **45.14** | **43.40** | **37.61** | **37.37** | **42.38** | **44.74** | **40.14** | **41.42** | **42.16** | **39.16** |

Fig. 1 SRS Meteorological Monitoring Network

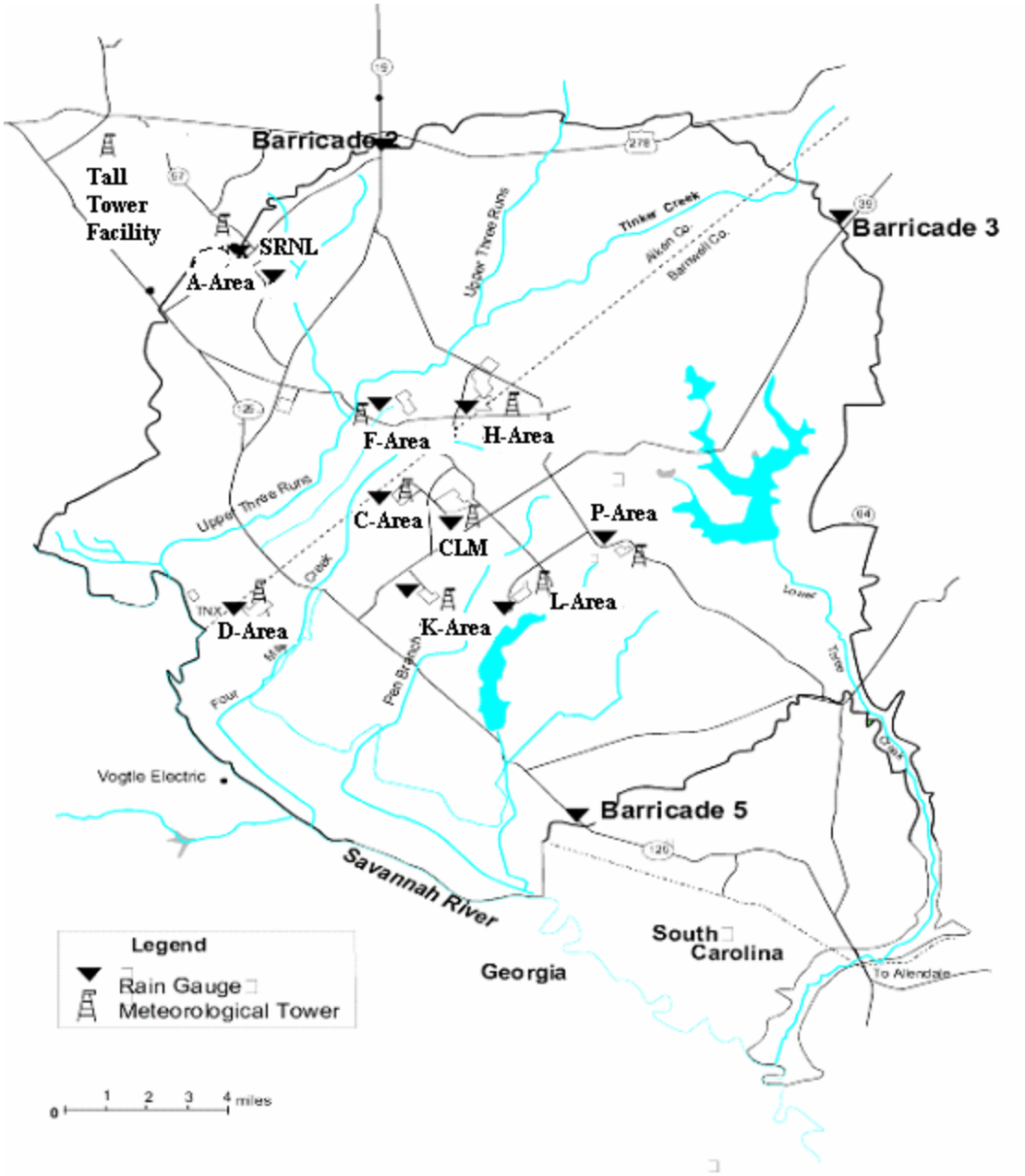


Fig. 2 - Summary of Daily Data for 2006

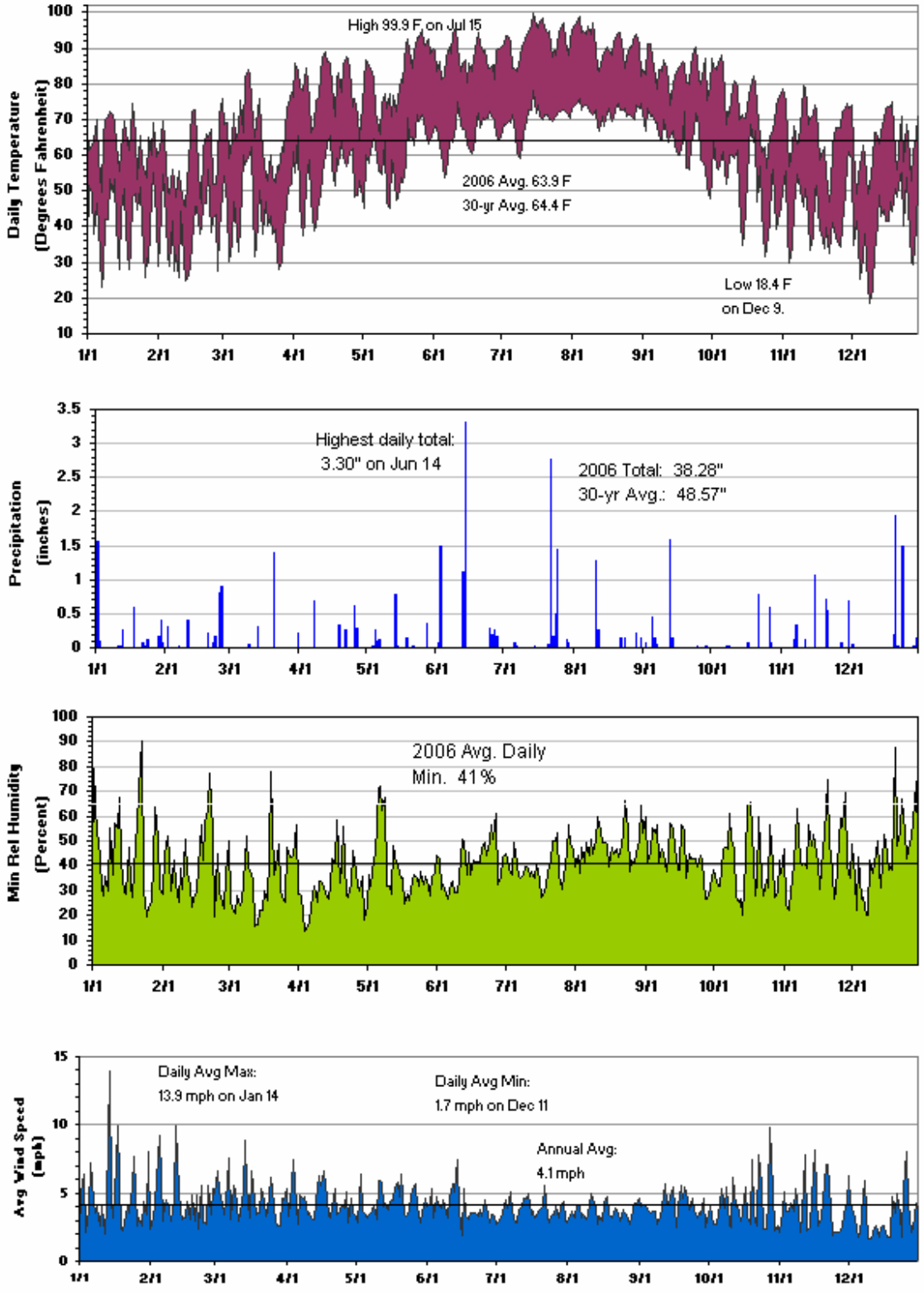


**Fig. 3 - Daily High and Low Temperatures for 2006**

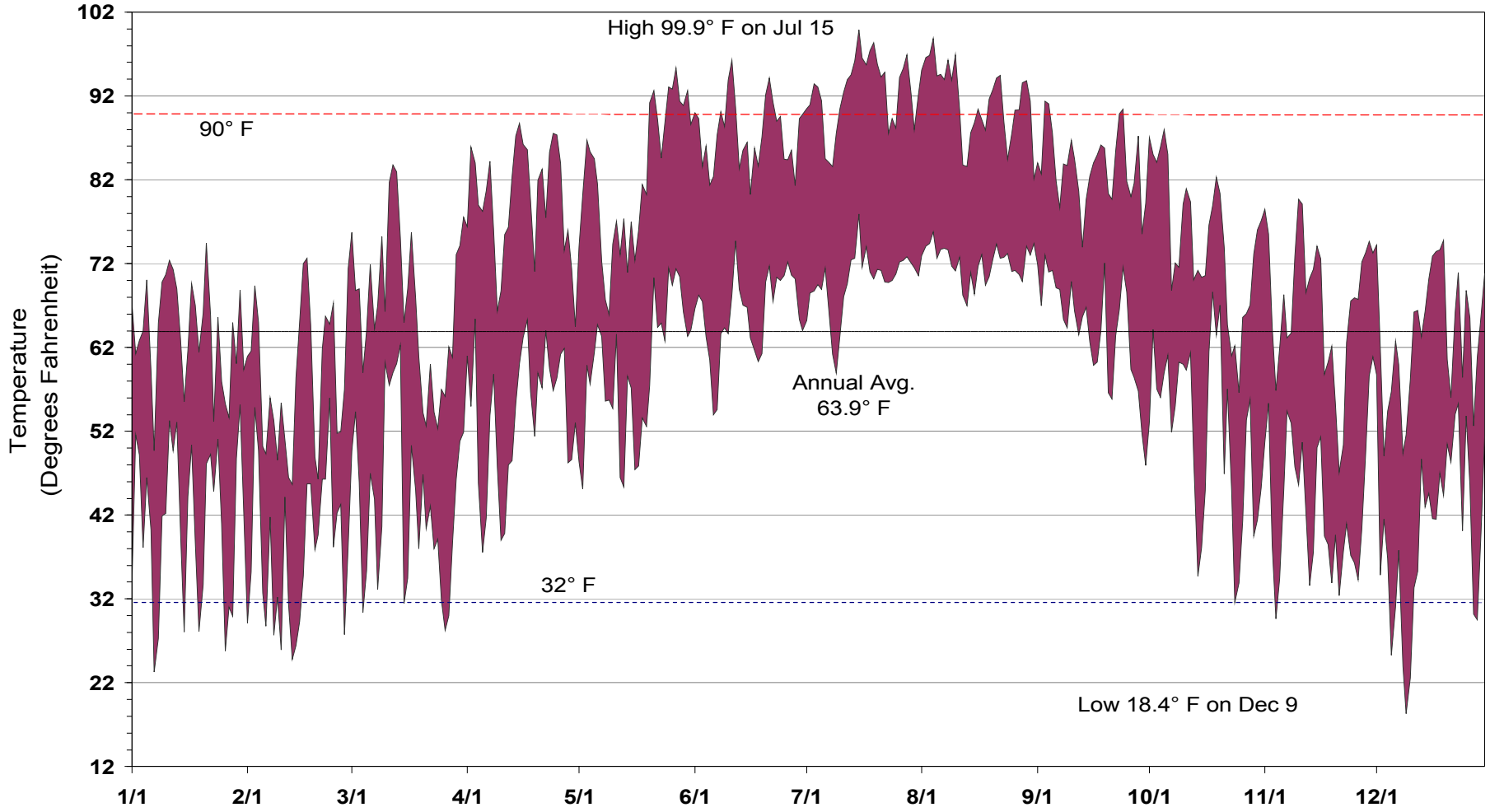


**Fig. 4 - SRS Annual Average Temperature 1976-2006**

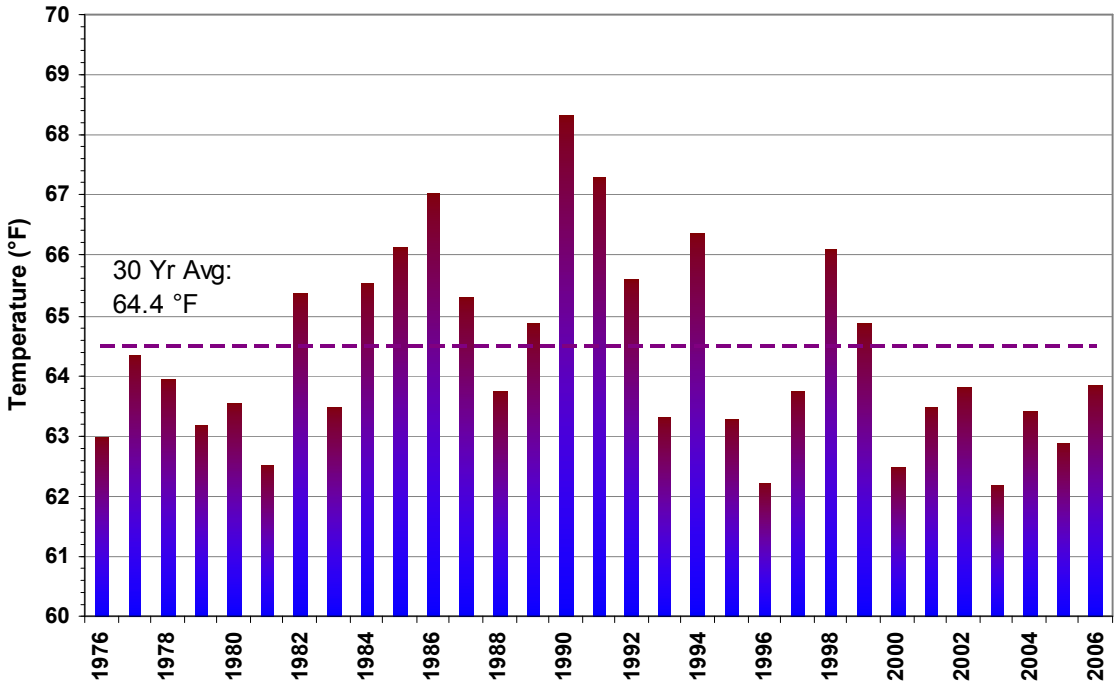



**Fig. 5 - SRS Monthly Average Temperature**

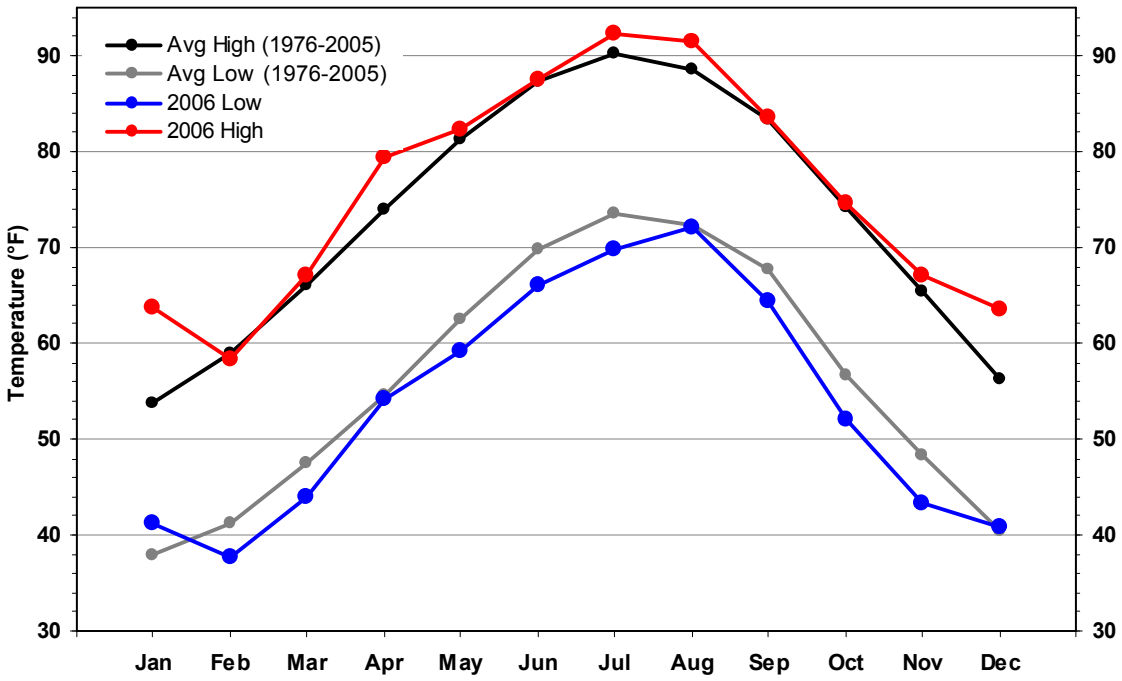


Fig. 6 - Number of Freezing (<32 F) and Sweltering (>90 F) Days

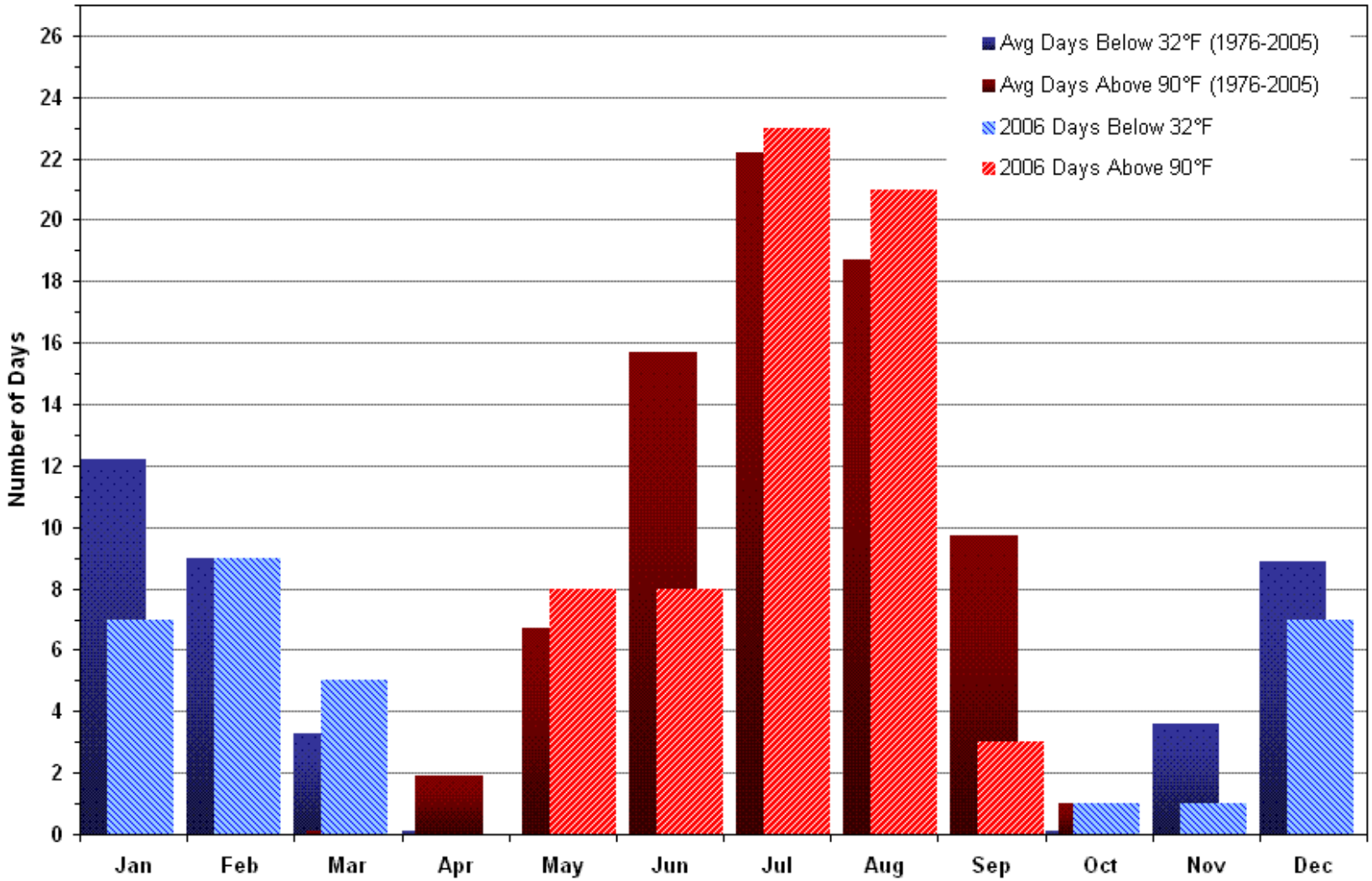


**Fig. 7 - Daily Precipitation for 2006**

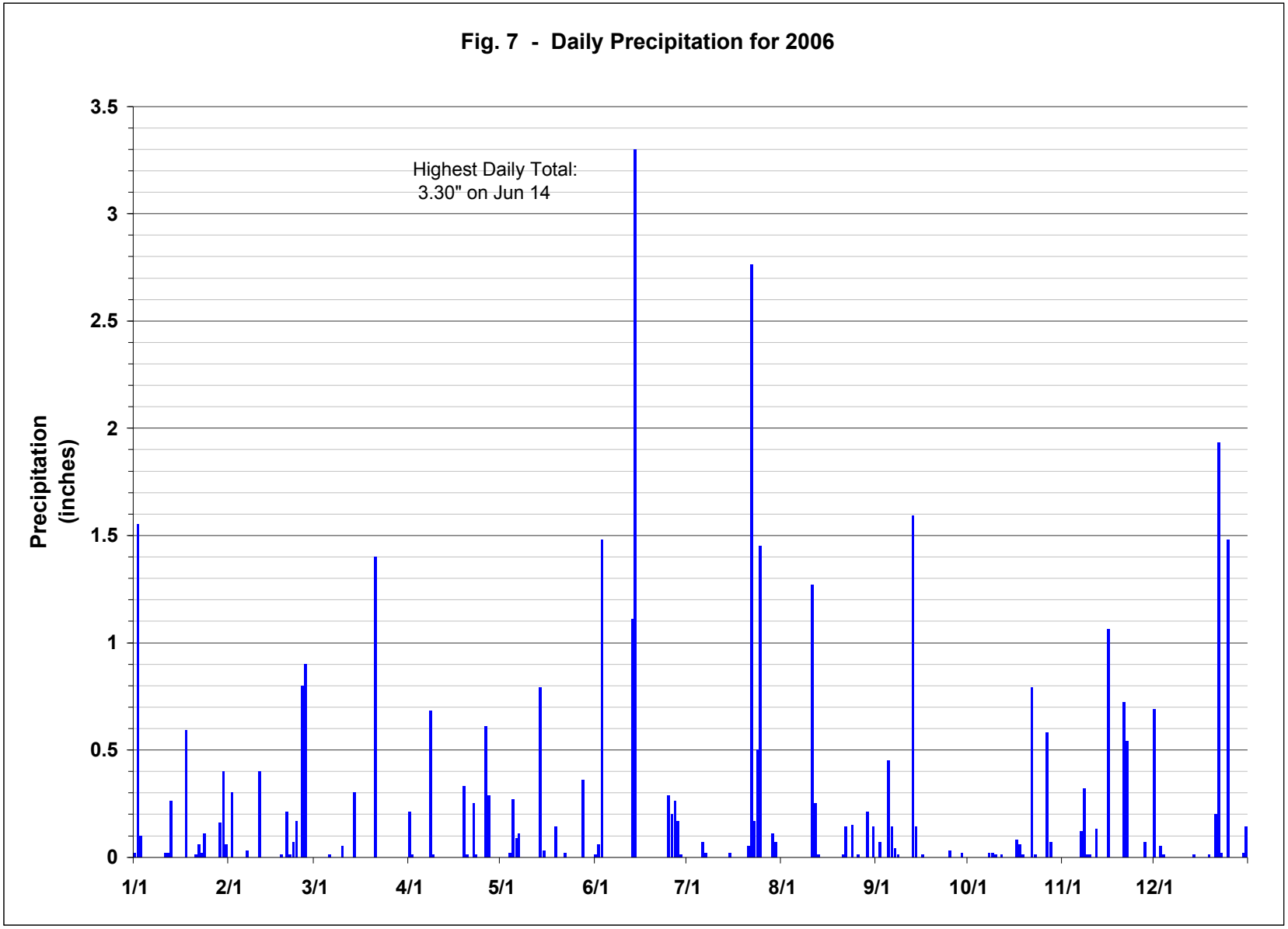


**Fig. 8 - SRS Annual Precipitation 1976-2006**

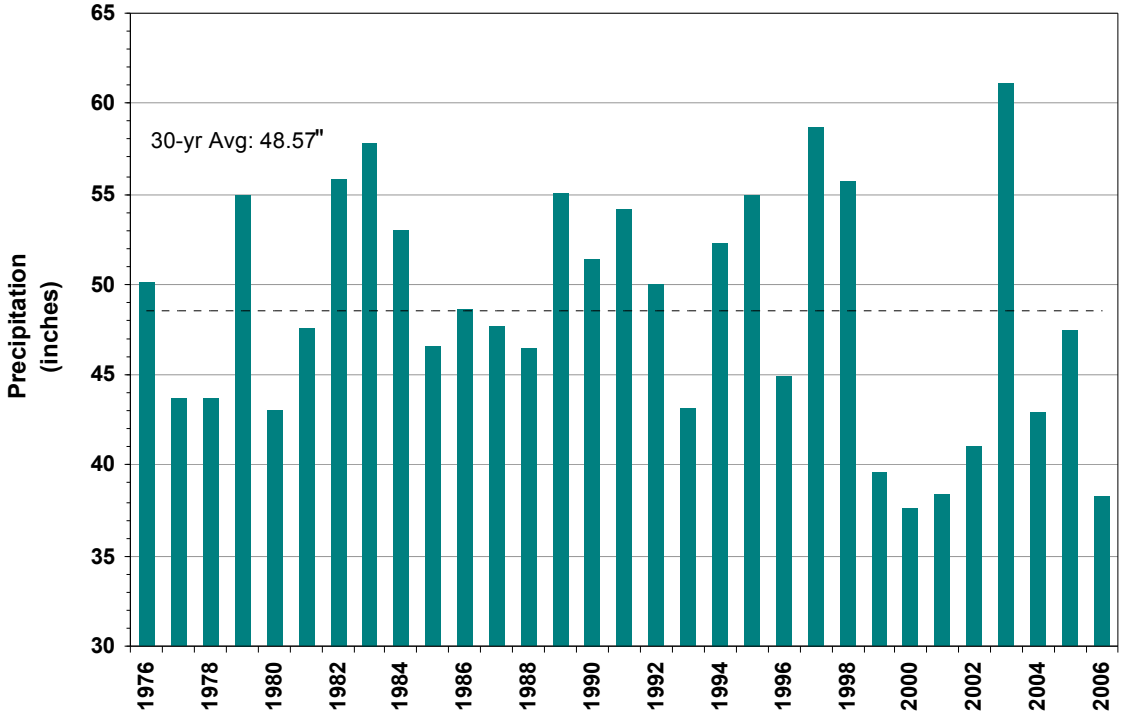



**Fig. 9 - SRS Monthly Precipitation**

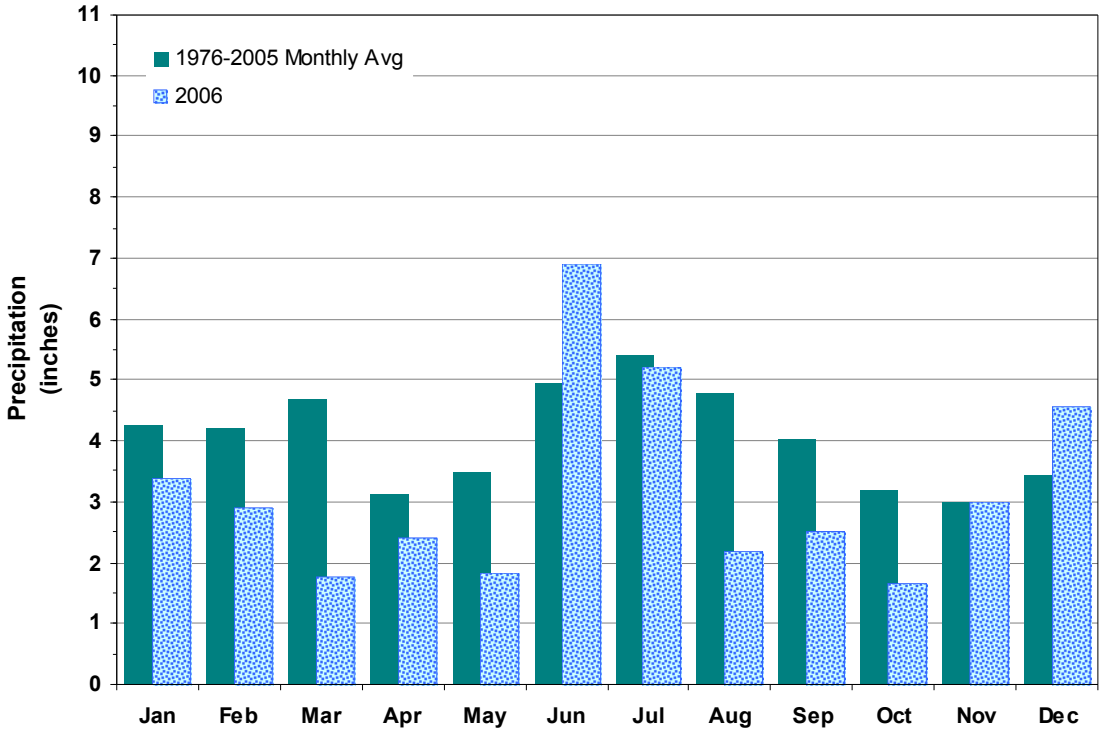


**Fig. 10 - Daily High and Low Humidity for 2006**

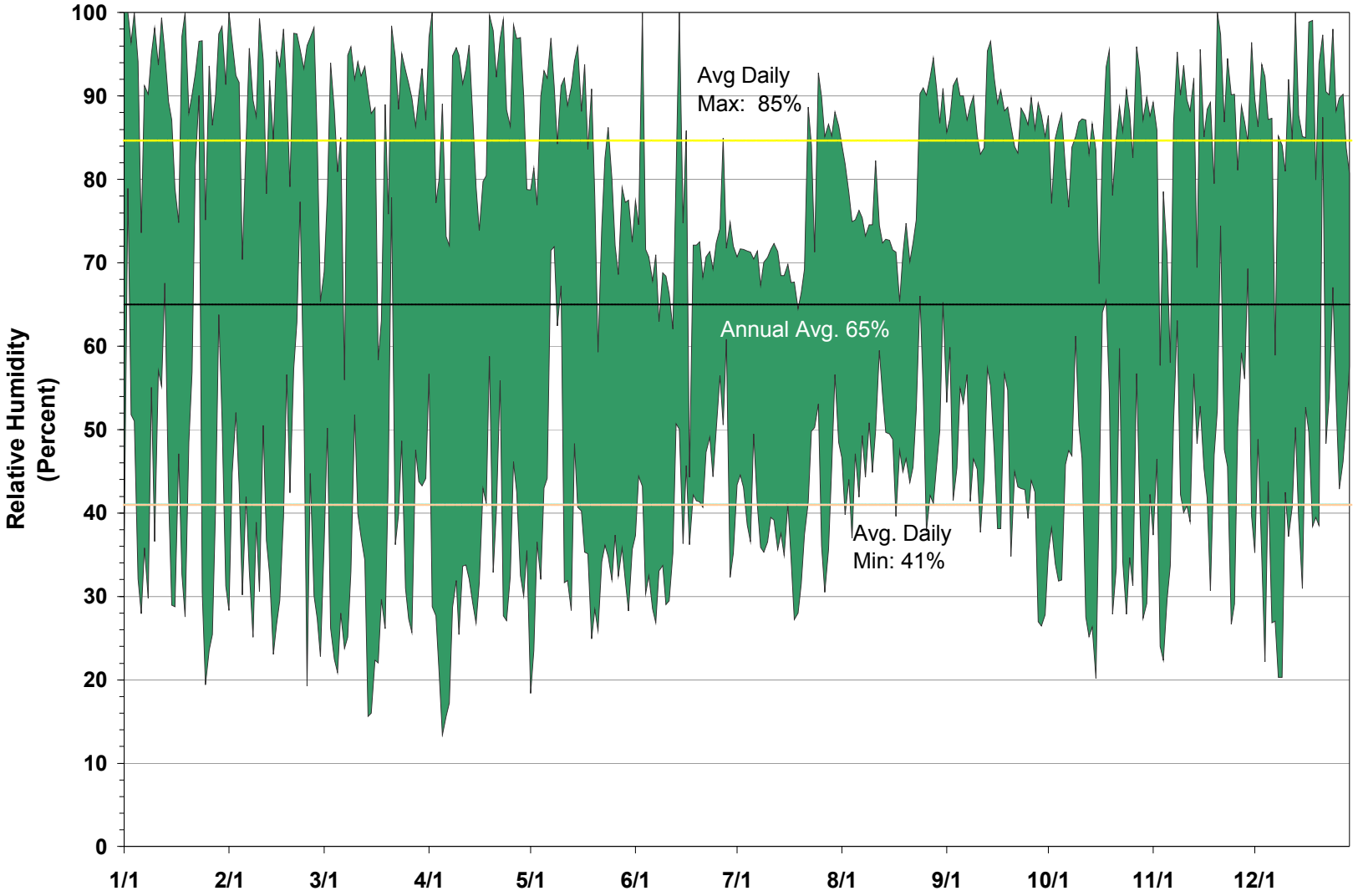


**Fig. 11 - SRS Annual Average Humidity 1976-2006**

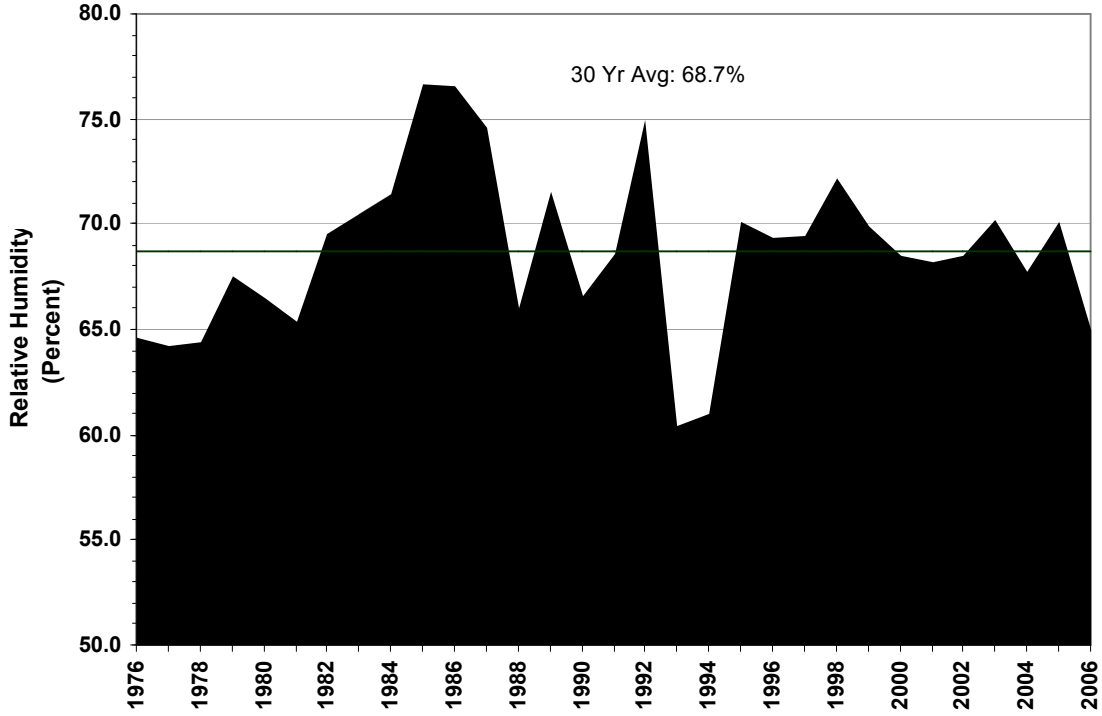



**Fig. 12 - SRS Monthly Average Minimum Humidity**

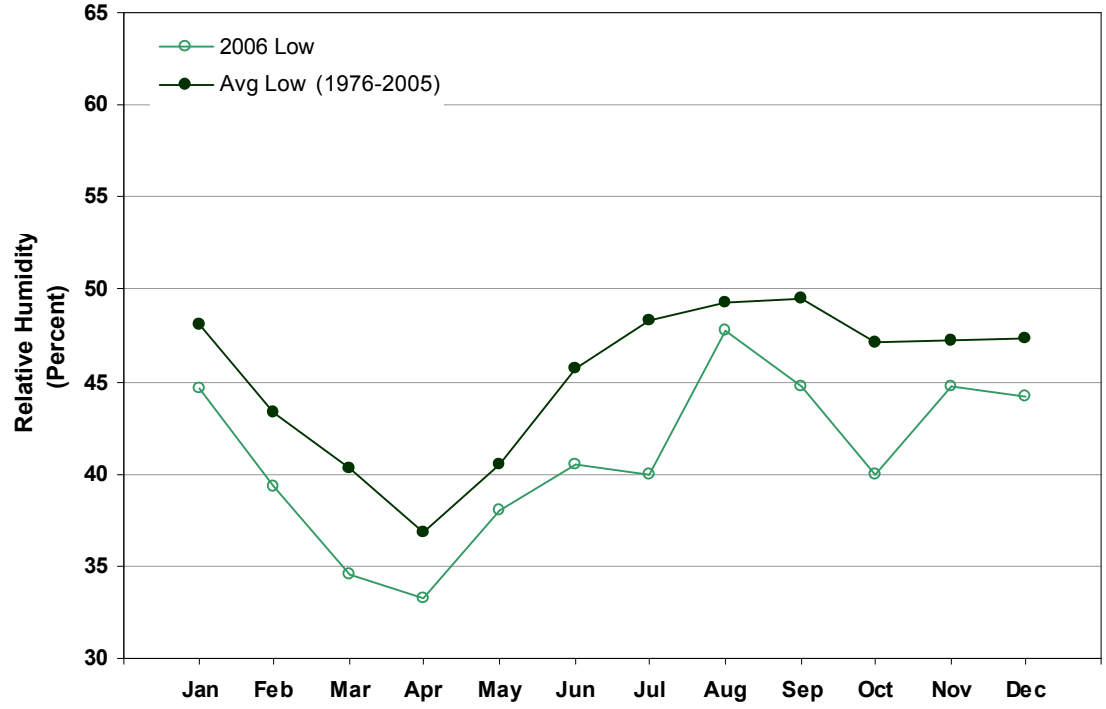
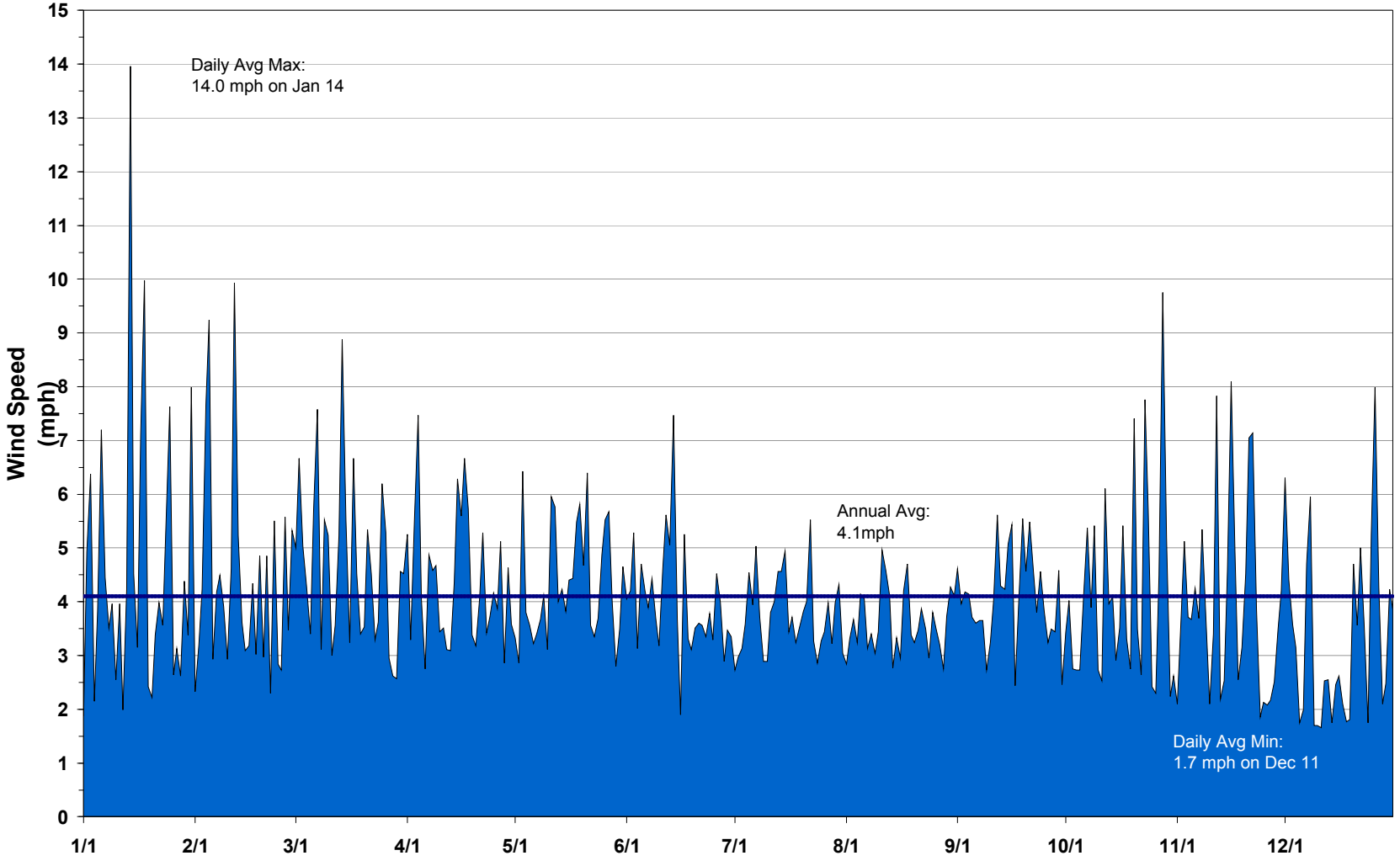
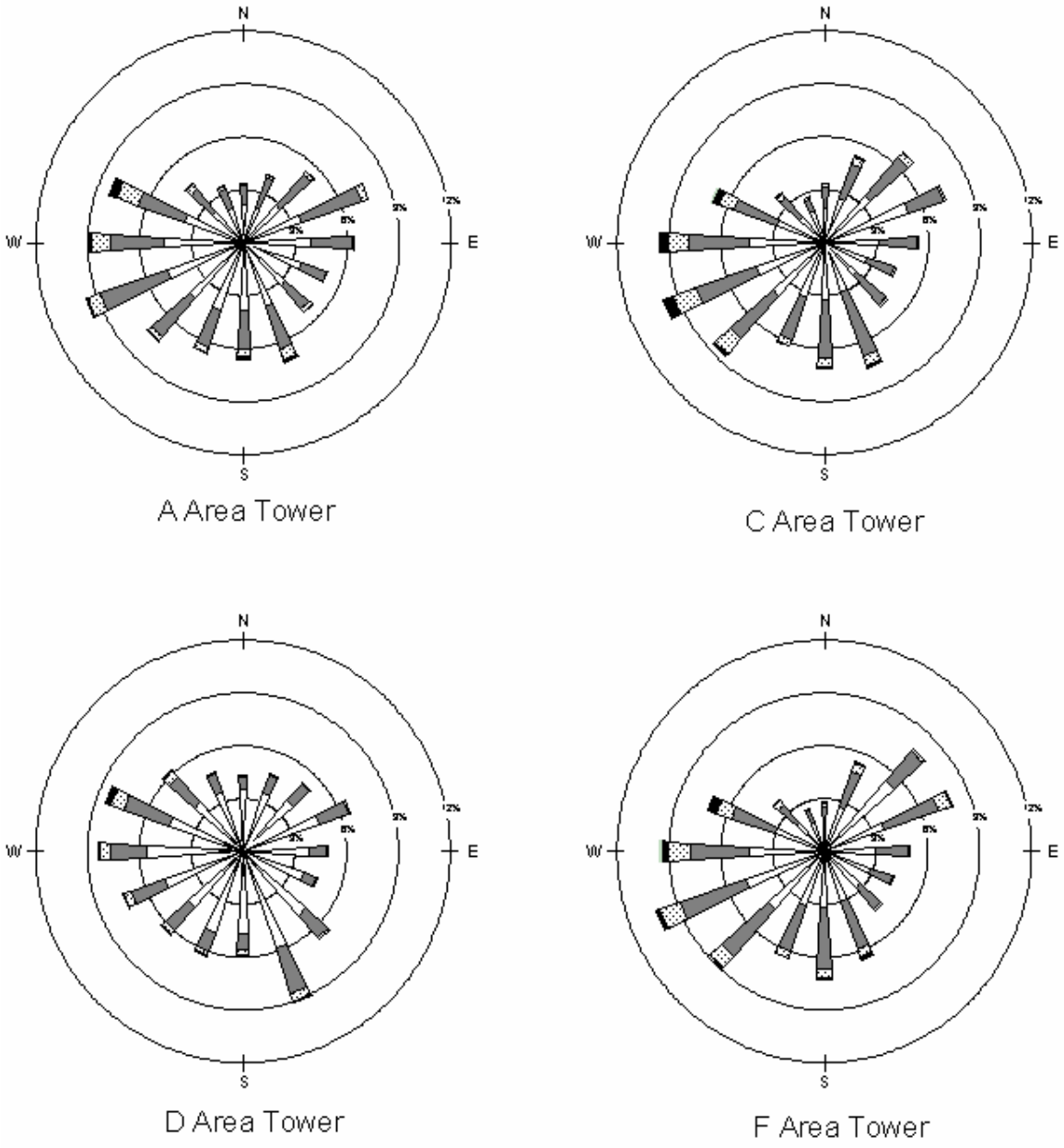


**Fig. 13 - Daily Average Wind Speed for 2006**

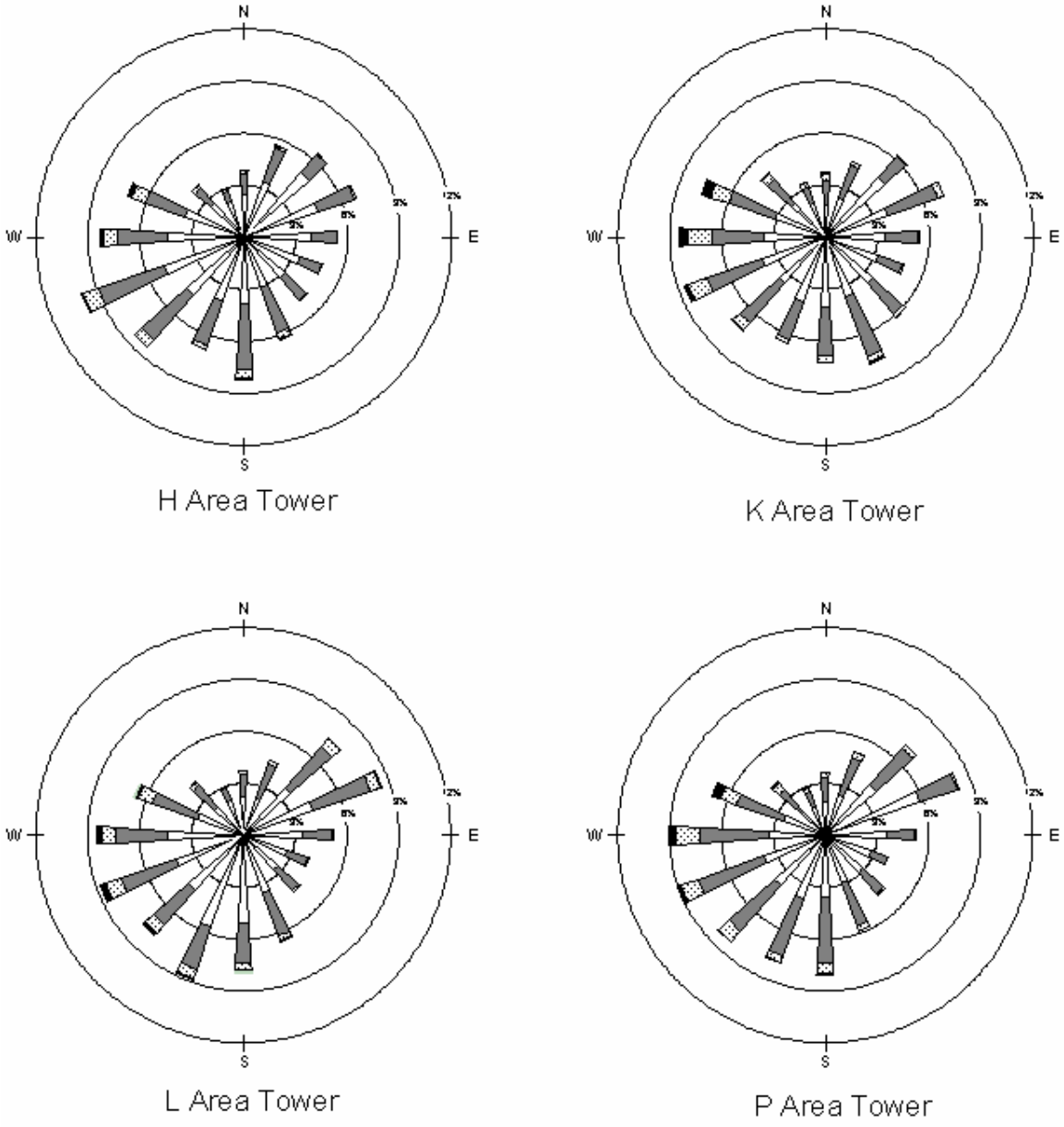


## Fig. 14(a) - Annual Wind Rose Plots for 2006, 61-m Level



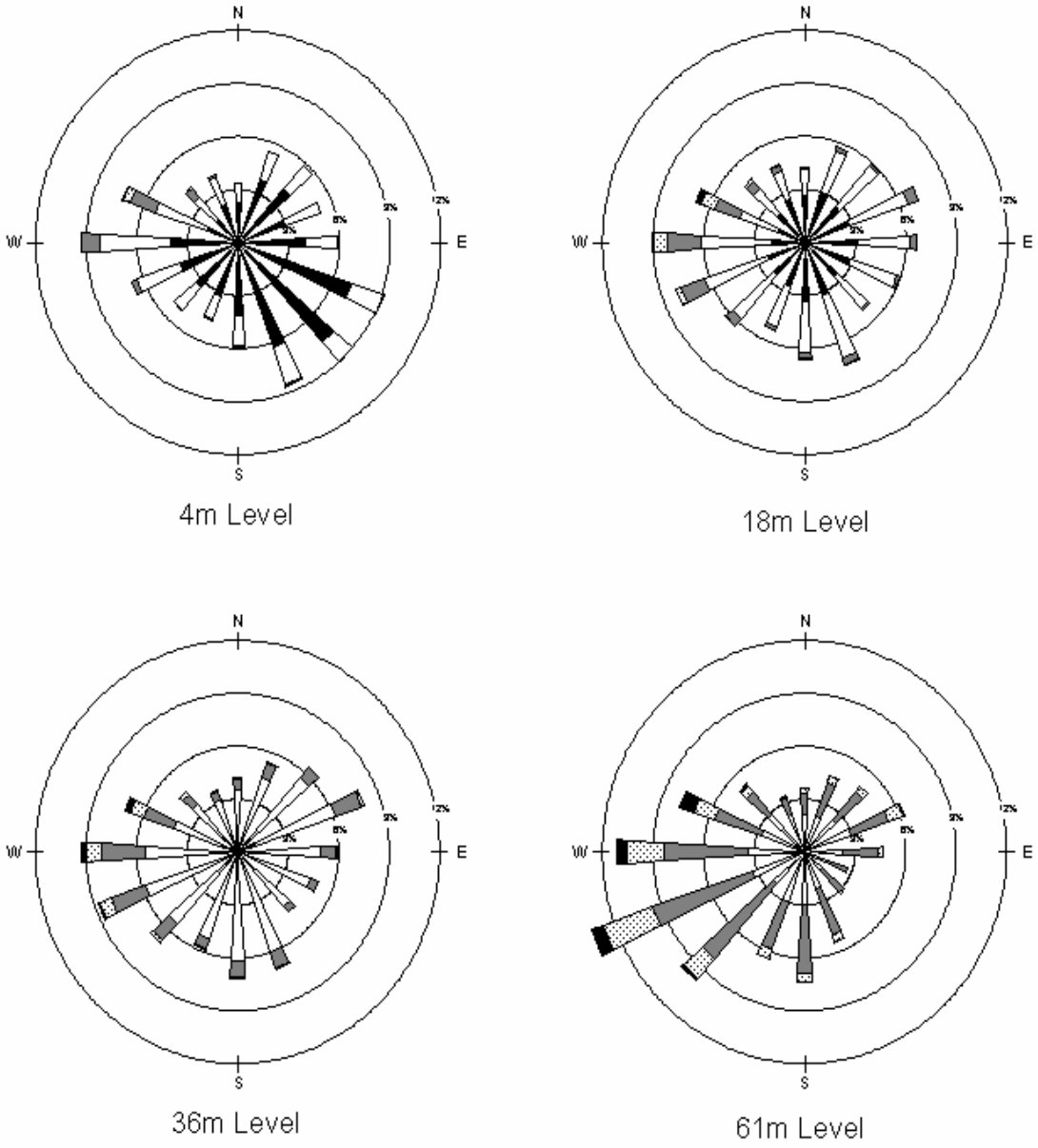

Windrose plot depicts the frequency of occurrence of wind direction sector (direction from which the wind blows) by wind speed category

## Fig. 14(b) - Annual Wind Rose Plots for 2006, 61-m Level



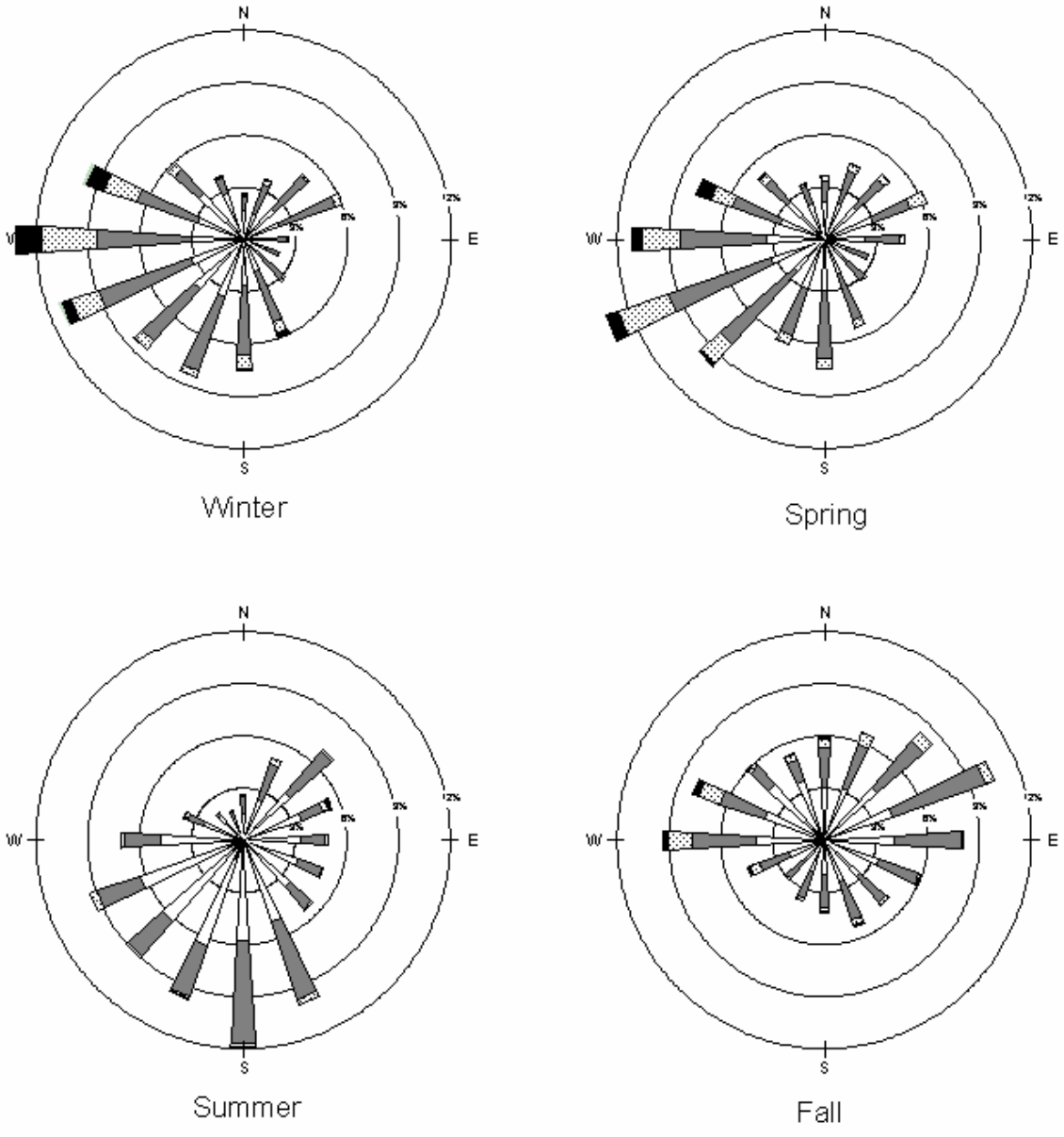

Windrose plot depicts the frequency of occurrence of wind direction sector (direction from which the wind blows) by wind speed category

Fig. 15 - Annual Wind Rose Plots for 2006, Central Climatology, All Levels




Windrose plot depicts the frequency of occurrence of wind direction sector (direction from which the wind blows) by wind speed category

Fig. 16 - Seasonal Wind Rose Plots for 2006, Central Climatology, 61-m Level




Windrose plot depicts the frequency of occurrence of wind direction sector (direction from which the wind blows) by wind speed category

**Fig. 17 - Daily Average Barometric Pressure for 2006**

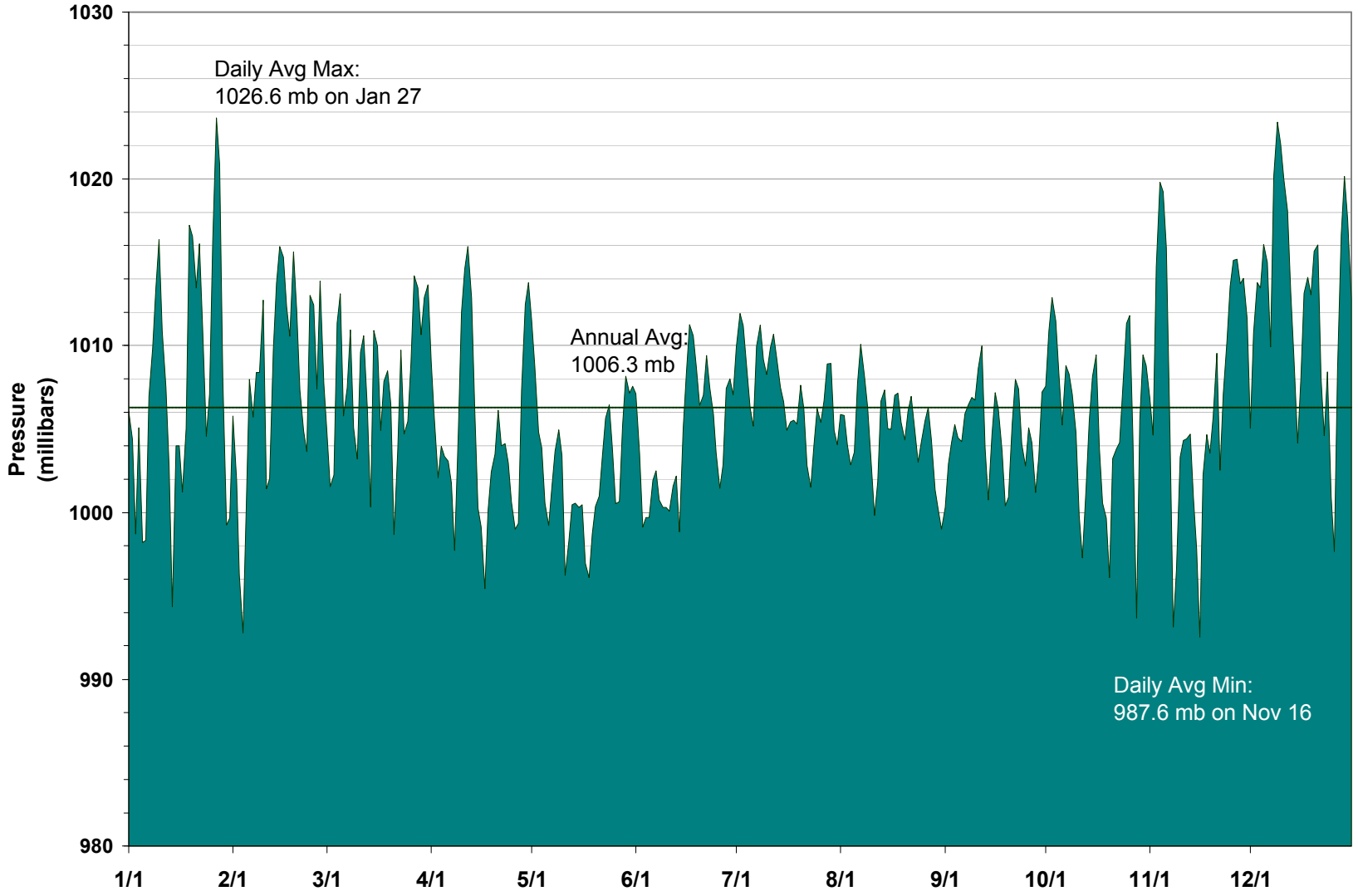


Fig. 18 - Daily Solar Radiation for 2006

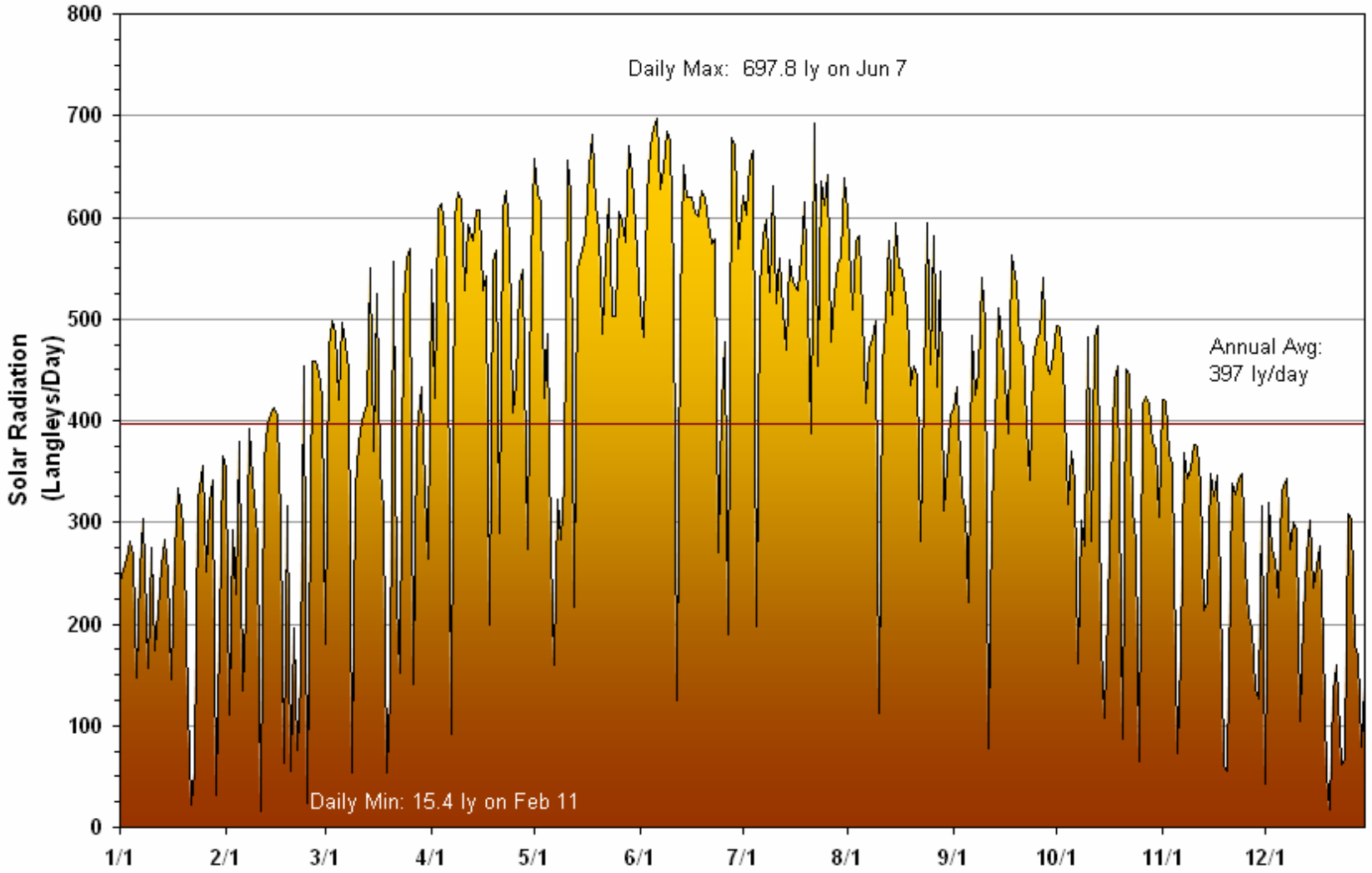


**Table A.1 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the A Area Tower, 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.004370 | 0.017709 | 0.010292 | 0.001207 | 0.000144 | 0.000000 | 0.033722 |
| NNE | 0.003910 | 0.017163 | 0.018054 | 0.001552 | 0.000259 | 0.000000 | 0.040938 |
| NE | 0.004542 | 0.023746 | 0.023746 | 0.002300 | 0.000172 | 0.000000 | 0.054506 |
| ENE | 0.005232 | 0.030444 | 0.036654 | 0.003766 | 0.000057 | 0.000000 | 0.076153 |
| E | 0.005462 | 0.033290 | 0.023602 | 0.001322 | 0.000057 | 0.000000 | 0.063733 |
| ESE | 0.006353 | 0.029122 | 0.015150 | 0.000345 | 0.000000 | 0.000000 | 0.050970 |
| SE | 0.006900 | 0.025471 | 0.017536 | 0.002472 | 0.000259 | 0.000000 | 0.052638 |
| SSE | 0.007359 | 0.031048 | 0.025385 | 0.006440 | 0.001466 | 0.000230 | 0.071928 |
| S | 0.006267 | 0.032428 | 0.021245 | 0.004801 | 0.001092 | 0.000115 | 0.065948 |
| SSW | 0.006210 | 0.034268 | 0.022481 | 0.003335 | 0.000086 | 0.000000 | 0.066380 |
| SW | 0.007187 | 0.034756 | 0.029150 | 0.002990 | 0.000316 | 0.000000 | 0.074399 |
| WSW | 0.008049 | 0.038724 | 0.040966 | 0.007791 | 0.001150 | 0.000000 | 0.096680 |
| WSW | 0.007733 | 0.038120 | 0.030990 | 0.010953 | 0.002444 | 0.000000 | 0.090240 |
| WNW | 0.006210 | 0.029697 | 0.028374 | 0.013425 | 0.004887 | 0.000029 | 0.082622 |
| NW | 0.004686 | 0.018945 | 0.016645 | 0.004053 | 0.000920 | 0.000000 | 0.045249 |
| NNW | 0.004283 | 0.016013 | 0.011787 | 0.001725 | 0.000086 | 0.000000 | 0.033894 |
| Total | 0.094753 | 0.450944 | 0.372057 | 0.068477 | 0.013395 | 0.000374 | 1.000000 |

**Table A.2 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the C Area Tower, 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.003950 | 0.015396 | 0.012426 | 0.002076 | 0.000144 | 0.000000 | 0.033992 |
| NNE | 0.003950 | 0.022489 | 0.020990 | 0.004209 | 0.000317 | 0.000000 | 0.051955 |
| NE | 0.004440 | 0.030389 | 0.029178 | 0.003806 | 0.000202 | 0.000000 | 0.068015 |
| ENE | 0.007727 | 0.043767 | 0.021335 | 0.001240 | 0.000029 | 0.000000 | 0.074098 |
| E | 0.005536 | 0.026150 | 0.021191 | 0.001413 | 0.000086 | 0.000000 | 0.054376 |
| ESE | 0.004815 | 0.021162 | 0.016463 | 0.001557 | 0.000000 | 0.000000 | 0.043997 |
| SE | 0.004873 | 0.020125 | 0.021681 | 0.001788 | 0.000029 | 0.000000 | 0.048496 |
| SSE | 0.005738 | 0.023844 | 0.038606 | 0.006026 | 0.001211 | 0.000029 | 0.075454 |
| S | 0.005305 | 0.026756 | 0.033848 | 0.005074 | 0.000980 | 0.000000 | 0.071963 |
| SSW | 0.005766 | 0.027390 | 0.025285 | 0.003489 | 0.000317 | 0.000000 | 0.062247 |
| SW | 0.006199 | 0.033791 | 0.033099 | 0.011360 | 0.001816 | 0.000000 | 0.086265 |
| WSW | 0.007294 | 0.034771 | 0.036587 | 0.014156 | 0.005680 | 0.000029 | 0.098517 |
| WSW | 0.007179 | 0.036703 | 0.034713 | 0.011677 | 0.005651 | 0.000259 | 0.096182 |
| WNW | 0.005853 | 0.023383 | 0.026064 | 0.009313 | 0.004354 | 0.000202 | 0.069169 |
| NW | 0.004152 | 0.015079 | 0.014820 | 0.002883 | 0.000750 | 0.000000 | 0.037684 |
| NNW | 0.003489 | 0.015454 | 0.007179 | 0.001355 | 0.000115 | 0.000000 | 0.027592 |
| Total | 0.086266 | 0.416649 | 0.393465 | 0.081422 | 0.021681 | 0.000519 | 1.000000 |

**Table A.3 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the D Area Tower, 2006**

| | Wind Speed Category, meters/sec | | | | | | |
|---|---|---|---|---|---|---|---|
| Sector | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | Total |
| N | 0.012054 | 0.023103 | 0.007433 | 0.000631 | 0.000000 | 0.000000 | 0.043221 |
| NNE | 0.009184 | 0.026059 | 0.010418 | 0.001205 | 0.000086 | 0.000000 | 0.046952 |
| NE | 0.008782 | 0.030048 | 0.012456 | 0.000660 | 0.000057 | 0.000000 | 0.052003 |
| ENE | 0.009959 | 0.037223 | 0.017880 | 0.001148 | 0.000115 | 0.000000 | 0.066325 |
| E | 0.009643 | 0.028728 | 0.010274 | 0.000517 | 0.000086 | 0.000000 | 0.049248 |
| ESE | 0.008954 | 0.028154 | 0.007950 | 0.000545 | 0.000057 | 0.000000 | 0.045660 |
| SE | 0.011078 | 0.037309 | 0.017191 | 0.001177 | 0.000201 | 0.000000 | 0.066956 |
| SSE | 0.012570 | 0.045689 | 0.026863 | 0.005080 | 0.000689 | 0.000000 | 0.090891 |
| S | 0.013718 | 0.032602 | 0.009040 | 0.003214 | 0.001492 | 0.000172 | 0.060238 |
| SSW | 0.013460 | 0.035501 | 0.011221 | 0.002095 | 0.000430 | 0.000000 | 0.062707 |
| SW | 0.011135 | 0.031139 | 0.017880 | 0.002612 | 0.000344 | 0.000000 | 0.063110 |
| WSW | 0.011738 | 0.036219 | 0.020893 | 0.004133 | 0.000545 | 0.000000 | 0.073528 |
| WSW | 0.013862 | 0.042303 | 0.021123 | 0.005826 | 0.001119 | 0.000000 | 0.084233 |
| WNW | 0.011422 | 0.033636 | 0.027637 | 0.008581 | 0.002956 | 0.000000 | 0.084232 |
| NW | 0.010647 | 0.026489 | 0.019630 | 0.004563 | 0.001004 | 0.000000 | 0.062333 |
| NNW | 0.010992 | 0.024653 | 0.011480 | 0.001205 | 0.000029 | 0.000000 | 0.048359 |
| Total | 0.179198 | 0.518855 | 0.249369 | 0.043192 | 0.009210 | 0.000172 | 1.000000 |

**Table A.4 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the F Area Tower, 2006**

| | Wind Speed Category, meters/sec | | | | | | |
|---|---|---|---|---|---|---|---|
| Sector | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | Total |
| N | 0.003791 | 0.011574 | 0.010253 | 0.002183 | 0.000287 | 0.000000 | 0.028088 |
| NNE | 0.005141 | 0.021855 | 0.021109 | 0.004767 | 0.000833 | 0.000000 | 0.053705 |
| NE | 0.007496 | 0.045979 | 0.022343 | 0.001924 | 0.000029 | 0.000000 | 0.077771 |
| ENE | 0.005543 | 0.031505 | 0.032970 | 0.007725 | 0.000833 | 0.000000 | 0.078576 |
| E | 0.005399 | 0.024038 | 0.018811 | 0.001149 | 0.000144 | 0.000000 | 0.049541 |
| ESE | 0.006175 | 0.022343 | 0.013354 | 0.000574 | 0.000000 | 0.000000 | 0.042446 |
| SE | 0.005830 | 0.021568 | 0.015853 | 0.001580 | 0.000144 | 0.000000 | 0.044975 |
| SSE | 0.005514 | 0.024584 | 0.028690 | 0.004825 | 0.001379 | 0.000000 | 0.064992 |
| S | 0.005773 | 0.026249 | 0.034865 | 0.004911 | 0.001063 | 0.000000 | 0.072861 |
| SSW | 0.005744 | 0.027140 | 0.026881 | 0.003992 | 0.000287 | 0.000000 | 0.064044 |
| SW | 0.007611 | 0.035526 | 0.036244 | 0.008702 | 0.001005 | 0.000000 | 0.089088 |
| WSW | 0.007410 | 0.040437 | 0.040465 | 0.012119 | 0.002125 | 0.000000 | 0.102556 |
| WSW | 0.008070 | 0.035181 | 0.034348 | 0.013182 | 0.004308 | 0.000029 | 0.095118 |
| WNW | 0.006347 | 0.023980 | 0.026680 | 0.009018 | 0.005141 | 0.000000 | 0.071166 |
| NW | 0.005227 | 0.015853 | 0.014159 | 0.003446 | 0.000517 | 0.000000 | 0.039202 |
| NNW | 0.004049 | 0.013297 | 0.007352 | 0.001120 | 0.000057 | 0.000000 | 0.025875 |
| Total | 0.095120 | 0.421109 | 0.384377 | 0.081217 | 0.018152 | 0.000029 | 1.000004 |

**Table A.5 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the H Area Tower, 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.005161 | 0.018979 | 0.012070 | 0.002351 | 0.000344 | 0.000000 | 0.038905 |
| NNE | 0.006651 | 0.027208 | 0.020126 | 0.001864 | 0.000201 | 0.000000 | 0.056050 |
| NE | 0.008085 | 0.041772 | 0.013761 | 0.000459 | 0.000029 | 0.000000 | 0.064106 |
| ENE | 0.006766 | 0.038217 | 0.022190 | 0.001175 | 0.000000 | 0.000000 | 0.068348 |
| E | 0.007311 | 0.031193 | 0.014851 | 0.000459 | 0.000057 | 0.000000 | 0.053871 |
| ESE | 0.006881 | 0.027752 | 0.013045 | 0.000201 | 0.000000 | 0.000000 | 0.047879 |
| SE | 0.005963 | 0.025401 | 0.016686 | 0.000889 | 0.000000 | 0.000000 | 0.048939 |
| SSE | 0.006766 | 0.024111 | 0.027666 | 0.003498 | 0.000803 | 0.000000 | 0.062844 |
| S | 0.006393 | 0.031508 | 0.038360 | 0.005304 | 0.000860 | 0.000029 | 0.082454 |
| SSW | 0.007196 | 0.031565 | 0.027236 | 0.002466 | 0.000143 | 0.000000 | 0.068606 |
| SW | 0.006995 | 0.037357 | 0.034604 | 0.005390 | 0.000430 | 0.000000 | 0.084776 |
| WSW | 0.006909 | 0.042202 | 0.039765 | 0.009002 | 0.001147 | 0.000000 | 0.099025 |
| WSW | 0.007053 | 0.037013 | 0.029100 | 0.007970 | 0.002437 | 0.000000 | 0.083573 |
| WNW | 0.007540 | 0.028383 | 0.024484 | 0.008114 | 0.002724 | 0.000000 | 0.071245 |
| NW | 0.006938 | 0.019209 | 0.011583 | 0.002036 | 0.000373 | 0.000000 | 0.040139 |
| NNW | 0.005361 | 0.016800 | 0.005763 | 0.001204 | 0.000115 | 0.000000 | 0.029243 |
| Total | 0.107969 | 0.478670 | 0.351290 | 0.052382 | 0.009663 | 0.000029 | 1.000003 |

**Table A.6 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the K Area Tower, 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.004519 | 0.013614 | 0.014628 | 0.003505 | 0.000840 | 0.000000 | 0.037106 |
| NNE | 0.005098 | 0.018654 | 0.019987 | 0.002143 | 0.000203 | 0.000000 | 0.046085 |
| NE | 0.007213 | 0.038206 | 0.016453 | 0.000811 | 0.000000 | 0.000000 | 0.062683 |
| ENE | 0.007647 | 0.030907 | 0.030038 | 0.003621 | 0.000319 | 0.000000 | 0.072532 |
| E | 0.008226 | 0.026301 | 0.018770 | 0.000956 | 0.000058 | 0.000000 | 0.054311 |
| ESE | 0.009240 | 0.022999 | 0.015004 | 0.000579 | 0.000029 | 0.000000 | 0.047851 |
| SE | 0.007184 | 0.028763 | 0.023550 | 0.001941 | 0.000203 | 0.000000 | 0.061641 |
| SSE | 0.006112 | 0.029980 | 0.037048 | 0.003186 | 0.001159 | 0.000000 | 0.077485 |
| S | 0.006691 | 0.034006 | 0.028242 | 0.003186 | 0.000290 | 0.000000 | 0.072415 |
| SSW | 0.007502 | 0.031776 | 0.023723 | 0.002230 | 0.000087 | 0.000000 | 0.065318 |
| SW | 0.006315 | 0.029343 | 0.030646 | 0.005156 | 0.000811 | 0.000000 | 0.072271 |
| WSW | 0.005909 | 0.032587 | 0.033630 | 0.011992 | 0.001883 | 0.000000 | 0.086001 |
| WSW | 0.005735 | 0.029980 | 0.030357 | 0.013846 | 0.004953 | 0.000087 | 0.084958 |
| WNW | 0.006865 | 0.024013 | 0.028358 | 0.011239 | 0.005330 | 0.000261 | 0.076066 |
| NW | 0.006459 | 0.019842 | 0.018017 | 0.004287 | 0.001101 | 0.000000 | 0.049706 |
| NNW | 0.004895 | 0.015381 | 0.010341 | 0.002694 | 0.000232 | 0.000029 | 0.033572 |
| Total | 0.105610 | 0.426352 | 0.378792 | 0.071372 | 0.017498 | 0.000377 | 1.000001 |

**Table A.7 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the L Area Tower, 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.004102 | 0.018140 | 0.013432 | 0.001531 | 0.000000 | 0.000000 | 0.037205 |
| NNE | 0.003351 | 0.018775 | 0.021231 | 0.002686 | 0.000144 | 0.000000 | 0.046187 |
| NE | 0.006441 | 0.029521 | 0.032409 | 0.006124 | 0.000202 | 0.000000 | 0.074697 |
| ENE | 0.006932 | 0.036020 | 0.034778 | 0.006384 | 0.000376 | 0.000000 | 0.084490 |
| E | 0.006153 | 0.027990 | 0.017244 | 0.000982 | 0.000087 | 0.000000 | 0.052456 |
| ESE | 0.005661 | 0.021346 | 0.012507 | 0.000433 | 0.000058 | 0.000000 | 0.040005 |
| SE | 0.004506 | 0.022184 | 0.016031 | 0.001127 | 0.000029 | 0.000000 | 0.043877 |
| SSE | 0.004882 | 0.030820 | 0.025737 | 0.002773 | 0.000924 | 0.000000 | 0.065136 |
| S | 0.007192 | 0.044050 | 0.022935 | 0.004102 | 0.001069 | 0.000029 | 0.079377 |
| SSW | 0.008348 | 0.047920 | 0.025621 | 0.005633 | 0.000722 | 0.000000 | 0.088244 |
| SW | 0.007019 | 0.034951 | 0.027036 | 0.006615 | 0.001820 | 0.000000 | 0.077441 |
| WSW | 0.007221 | 0.033478 | 0.033767 | 0.009850 | 0.003091 | 0.000000 | 0.087407 |
| WSW | 0.007366 | 0.036915 | 0.029347 | 0.008492 | 0.003091 | 0.000058 | 0.085269 |
| WNW | 0.004622 | 0.023426 | 0.027614 | 0.008146 | 0.003004 | 0.000116 | 0.066928 |
| NW | 0.005430 | 0.016378 | 0.016840 | 0.002253 | 0.000289 | 0.000000 | 0.041190 |
| NNW | 0.004679 | 0.017013 | 0.007510 | 0.000895 | 0.000000 | 0.000000 | 0.030097 |
| Total | 0.093905 | 0.458927 | 0.364039 | 0.068026 | 0.014906 | 0.000203 | 1.000000 |

**Table A.8 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the P Area Tower, 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.003546 | 0.015309 | 0.014415 | 0.003056 | 0.000259 | 0.000000 | 0.036585 |
| NNE | 0.004757 | 0.019634 | 0.023036 | 0.003460 | 0.000519 | 0.000000 | 0.051406 |
| NE | 0.005161 | 0.033646 | 0.028370 | 0.003027 | 0.000173 | 0.000000 | 0.070377 |
| ENE | 0.008534 | 0.049647 | 0.022805 | 0.001182 | 0.000000 | 0.000000 | 0.082168 |
| E | 0.006372 | 0.029350 | 0.016145 | 0.000548 | 0.000144 | 0.000000 | 0.052559 |
| ESE | 0.005103 | 0.023122 | 0.010235 | 0.000317 | 0.000029 | 0.000000 | 0.038806 |
| SE | 0.005882 | 0.022978 | 0.015828 | 0.000980 | 0.000029 | 0.000000 | 0.045697 |
| SSE | 0.005651 | 0.023295 | 0.026842 | 0.002739 | 0.000519 | 0.000000 | 0.059046 |
| S | 0.005161 | 0.030503 | 0.038374 | 0.006083 | 0.001124 | 0.000086 | 0.081331 |
| SSW | 0.005853 | 0.032838 | 0.035404 | 0.003979 | 0.000259 | 0.000000 | 0.078333 |
| SW | 0.006026 | 0.032838 | 0.035404 | 0.007727 | 0.000894 | 0.000000 | 0.082889 |
| WSW | 0.005737 | 0.031253 | 0.040738 | 0.010840 | 0.001528 | 0.000000 | 0.090096 |
| WSW | 0.005017 | 0.027245 | 0.040680 | 0.013320 | 0.004180 | 0.000000 | 0.090442 |
| WNW | 0.004642 | 0.020845 | 0.028398 | 0.010379 | 0.005017 | 0.000375 | 0.069656 |
| NW | 0.003835 | 0.014531 | 0.017241 | 0.004786 | 0.001269 | 0.000000 | 0.041662 |
| NNW | 0.003575 | 0.013666 | 0.009947 | 0.001615 | 0.000144 | 0.000000 | 0.028947 |
| Total | 0.084852 | 0.420700 | 0.403862 | 0.074038 | 0.016087 | 0.000461 | 1.000000 |

**Table A.9 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the 4m Level Central Climatology Tower, 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.023066 | 0.010621 | 0.000088 | 0.000000 | 0.000000 | 0.000000 | 0.033775 |
| NNE | 0.037746 | 0.016946 | 0.000294 | 0.000000 | 0.000000 | 0.000000 | 0.054986 |
| NE | 0.040571 | 0.017946 | 0.000118 | 0.000000 | 0.000000 | 0.000000 | 0.058635 |
| ENE | 0.029744 | 0.021742 | 0.000382 | 0.000000 | 0.000000 | 0.000000 | 0.051868 |
| E | 0.039453 | 0.019270 | 0.000677 | 0.000000 | 0.000000 | 0.000000 | 0.059400 |
| ESE | 0.071168 | 0.019712 | 0.000235 | 0.000000 | 0.000000 | 0.000000 | 0.091115 |
| SE | 0.075140 | 0.014593 | 0.000177 | 0.000000 | 0.000000 | 0.000000 | 0.089910 |
| SSE | 0.062371 | 0.022683 | 0.001265 | 0.000059 | 0.000000 | 0.000000 | 0.086378 |
| S | 0.041512 | 0.017034 | 0.001147 | 0.000206 | 0.000000 | 0.000000 | 0.059899 |
| SSW | 0.032274 | 0.013504 | 0.000824 | 0.000000 | 0.000000 | 0.000000 | 0.046602 |
| SW | 0.033628 | 0.016799 | 0.000441 | 0.000000 | 0.000000 | 0.000000 | 0.050868 |
| WSW | 0.036275 | 0.027596 | 0.003266 | 0.000000 | 0.000000 | 0.000000 | 0.067137 |
| WSW | 0.040482 | 0.041748 | 0.010474 | 0.000677 | 0.000000 | 0.000000 | 0.093381 |
| WNW | 0.019417 | 0.032892 | 0.015828 | 0.004266 | 0.000353 | 0.000000 | 0.072756 |
| NW | 0.017358 | 0.017329 | 0.006502 | 0.000971 | 0.000000 | 0.000000 | 0.042160 |
| NNW | 0.022919 | 0.016152 | 0.001942 | 0.000118 | 0.000000 | 0.000000 | 0.041131 |
| Total | 0.623124 | 0.326567 | 0.043660 | 0.006297 | 0.000353 | 0.000000 | 1.000001 |

**Table A.10 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the 18m Level Central Climatology Tower, 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.02684 | 0.01426 | 0.00157 | 0.00000 | 0.00000 | 0.00000 | 0.04268 |
| NNE | 0.02998 | 0.02486 | 0.00280 | 0.00003 | 0.00000 | 0.00000 | 0.05767 |
| NE | 0.02701 | 0.03065 | 0.00189 | 0.00003 | 0.00000 | 0.00000 | 0.05959 |
| ENE | 0.02777 | 0.03709 | 0.00640 | 0.00032 | 0.00000 | 0.00000 | 0.07158 |
| E | 0.03159 | 0.03030 | 0.00413 | 0.00018 | 0.00000 | 0.00000 | 0.06620 |
| ESE | 0.02847 | 0.02940 | 0.00166 | 0.00000 | 0.00000 | 0.00000 | 0.05953 |
| SE | 0.02588 | 0.02442 | 0.00128 | 0.00000 | 0.00000 | 0.00000 | 0.05158 |
| SSE | 0.03176 | 0.03784 | 0.00338 | 0.00047 | 0.00006 | 0.00000 | 0.07350 |
| S | 0.03371 | 0.02865 | 0.00332 | 0.00041 | 0.00003 | 0.00000 | 0.06611 |
| SSW | 0.02655 | 0.02437 | 0.00233 | 0.00006 | 0.00000 | 0.00000 | 0.05330 |
| SW | 0.02454 | 0.03284 | 0.00544 | 0.00018 | 0.00000 | 0.00000 | 0.06300 |
| WSW | 0.02265 | 0.04081 | 0.01418 | 0.00323 | 0.00003 | 0.00000 | 0.08090 |
| WSW | 0.01933 | 0.04192 | 0.02079 | 0.00742 | 0.00154 | 0.00000 | 0.09100 |
| WNW | 0.01613 | 0.02463 | 0.01587 | 0.00844 | 0.00349 | 0.00003 | 0.06858 |
| NW | 0.02250 | 0.01808 | 0.00606 | 0.00140 | 0.00012 | 0.00000 | 0.04815 |
| NNW | 0.02568 | 0.01706 | 0.00364 | 0.00026 | 0.00000 | 0.00000 | 0.04664 |
| Total | 0.42038 | 0.45718 | 0.09473 | 0.02242 | 0.00527 | 0.00003 | 1.00000 |

**Table A.11 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the 36m Level Central Climatology Tower, 2006**

| | Wind Speed Category, meters/sec | | | | | | |
|---|---|---|---|---|---|---|---|
| Sector | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | Total |
| N | 0.009705 | 0.025165 | 0.006123 | 0.000949 | 0.000000 | 0.000000 | 0.041942 |
| NNE | 0.007837 | 0.036615 | 0.008756 | 0.000980 | 0.000000 | 0.000000 | 0.054188 |
| NE | 0.011021 | 0.045249 | 0.007776 | 0.000337 | 0.000031 | 0.000000 | 0.064414 |
| ENE | 0.011205 | 0.049871 | 0.016624 | 0.001867 | 0.000061 | 0.000000 | 0.079628 |
| E | 0.010317 | 0.039156 | 0.008909 | 0.000765 | 0.000000 | 0.000000 | 0.059147 |
| ESE | 0.009154 | 0.036523 | 0.005021 | 0.000092 | 0.000000 | 0.000000 | 0.050790 |
| SE | 0.008940 | 0.032452 | 0.004255 | 0.000031 | 0.000000 | 0.000000 | 0.045678 |
| SSE | 0.008848 | 0.051127 | 0.009521 | 0.000765 | 0.000031 | 0.000000 | 0.070292 |
| S | 0.010164 | 0.051892 | 0.008970 | 0.000735 | 0.000031 | 0.000000 | 0.071792 |
| SSW | 0.011695 | 0.040748 | 0.005480 | 0.000765 | 0.000031 | 0.000000 | 0.058719 |
| SW | 0.010685 | 0.043136 | 0.013195 | 0.001470 | 0.000122 | 0.000000 | 0.068608 |
| WSW | 0.009980 | 0.047545 | 0.021798 | 0.007654 | 0.001010 | 0.000000 | 0.087987 |
| WSW | 0.009735 | 0.045432 | 0.026084 | 0.008817 | 0.002694 | 0.000000 | 0.092762 |
| WNW | 0.010868 | 0.029360 | 0.018430 | 0.008419 | 0.003551 | 0.000031 | 0.070659 |
| NW | 0.013011 | 0.023022 | 0.007684 | 0.002296 | 0.000337 | 0.000000 | 0.046350 |
| NNW | 0.011756 | 0.019410 | 0.005266 | 0.000582 | 0.000031 | 0.000000 | 0.037045 |
| Total | 0.164921 | 0.616703 | 0.173892 | 0.036524 | 0.007930 | 0.000031 | 1.000001 |

**Table A.12 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the 61m Level Central Climatology Tower, 2006**

| | Wind Speed Category, meters/sec | | | | | | |
|---|---|---|---|---|---|---|---|
| Sector | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | Total |
| N | 0.00294 | 0.01835 | 0.01223 | 0.00259 | 0.00024 | 0.00000 | 0.03634 |
| NNE | 0.00294 | 0.01835 | 0.02047 | 0.00365 | 0.00035 | 0.00000 | 0.04575 |
| NE | 0.00294 | 0.02211 | 0.02058 | 0.00400 | 0.00012 | 0.00000 | 0.04975 |
| ENE | 0.00294 | 0.02658 | 0.02305 | 0.00953 | 0.00035 | 0.00000 | 0.06246 |
| E | 0.00329 | 0.01953 | 0.02070 | 0.00271 | 0.00035 | 0.00000 | 0.04658 |
| ESE | 0.00294 | 0.01117 | 0.01294 | 0.00012 | 0.00000 | 0.00000 | 0.02717 |
| SE | 0.00259 | 0.01129 | 0.01706 | 0.00094 | 0.00000 | 0.00000 | 0.03188 |
| SSE | 0.00318 | 0.01823 | 0.02811 | 0.00459 | 0.00012 | 0.00000 | 0.05422 |
| S | 0.00459 | 0.02494 | 0.03905 | 0.00553 | 0.00012 | 0.00000 | 0.07422 |
| SSW | 0.00365 | 0.02658 | 0.02811 | 0.00576 | 0.00012 | 0.00000 | 0.06422 |
| SW | 0.00353 | 0.02070 | 0.05622 | 0.01517 | 0.00188 | 0.00000 | 0.09751 |
| WSW | 0.00635 | 0.02623 | 0.06293 | 0.03117 | 0.00741 | 0.00000 | 0.13409 |
| WSW | 0.00612 | 0.02752 | 0.04987 | 0.02188 | 0.00600 | 0.00012 | 0.11150 |
| WNW | 0.00718 | 0.01988 | 0.02917 | 0.01294 | 0.00929 | 0.00012 | 0.07857 |
| NW | 0.00694 | 0.02200 | 0.01741 | 0.00388 | 0.00165 | 0.00000 | 0.05187 |
| NNW | 0.00376 | 0.01823 | 0.01023 | 0.00129 | 0.00035 | 0.00000 | 0.03388 |
| Total | 0.06587 | 0.33169 | 0.44813 | 0.12573 | 0.02835 | 0.00024 | 1.00000 |

**Table A.13 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the 61m Level Central Climatology Tower, Winter 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.00383 | 0.01254 | 0.00812 | 0.00139 | 0.00046 | 0.00000 | 0.02635 |
| NNE | 0.00325 | 0.01219 | 0.01787 | 0.00313 | 0.00046 | 0.00000 | 0.03691 |
| NE | 0.00325 | 0.02078 | 0.02472 | 0.00197 | 0.00000 | 0.00000 | 0.05072 |
| ENE | 0.00395 | 0.01834 | 0.03377 | 0.00429 | 0.00000 | 0.00000 | 0.06035 |
| E | 0.00371 | 0.00963 | 0.01114 | 0.00151 | 0.00000 | 0.00000 | 0.02600 |
| ESE | 0.00395 | 0.00975 | 0.00789 | 0.00070 | 0.00000 | 0.00000 | 0.02228 |
| SE | 0.00302 | 0.00824 | 0.01938 | 0.00151 | 0.00000 | 0.00000 | 0.03215 |
| SSE | 0.00313 | 0.01579 | 0.03145 | 0.00650 | 0.00302 | 0.00000 | 0.05989 |
| S | 0.00418 | 0.02194 | 0.04027 | 0.00743 | 0.00163 | 0.00000 | 0.07544 |
| SSW | 0.00696 | 0.02820 | 0.04480 | 0.00395 | 0.00023 | 0.00000 | 0.08415 |
| SW | 0.00604 | 0.03227 | 0.04004 | 0.00615 | 0.00046 | 0.00000 | 0.08496 |
| WSW | 0.00499 | 0.02704 | 0.05710 | 0.01683 | 0.00650 | 0.00012 | 0.11258 |
| WSW | 0.00499 | 0.02530 | 0.05455 | 0.03250 | 0.01474 | 0.00023 | 0.13231 |
| WNW | 0.00708 | 0.02112 | 0.03714 | 0.02008 | 0.01172 | 0.00116 | 0.09831 |
| NW | 0.00685 | 0.02797 | 0.01903 | 0.00453 | 0.00035 | 0.00000 | 0.05873 |
| NNW | 0.00522 | 0.02310 | 0.00917 | 0.00116 | 0.00023 | 0.00000 | 0.03888 |
| Total | 0.07440 | 0.31418 | 0.45648 | 0.11363 | 0.03981 | 0.00151 | 1.00000 |

**Table A.14 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the 61m Level Central Climatology Tower, Spring 2006**

| Sector | Wind Speed Category, meters/sec | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | |
| N | 0.00294 | 0.01835 | 0.01223 | 0.00259 | 0.00024 | 0.00000 | 0.03634 |
| NNE | 0.00294 | 0.01835 | 0.02047 | 0.00365 | 0.00035 | 0.00000 | 0.04575 |
| NE | 0.00294 | 0.02211 | 0.02058 | 0.00400 | 0.00012 | 0.00000 | 0.04975 |
| ENE | 0.00294 | 0.02658 | 0.02305 | 0.00953 | 0.00035 | 0.00000 | 0.06246 |
| E | 0.00329 | 0.01953 | 0.02070 | 0.00271 | 0.00035 | 0.00000 | 0.04658 |
| ESE | 0.00294 | 0.01117 | 0.01294 | 0.00012 | 0.00000 | 0.00000 | 0.02717 |
| SE | 0.00259 | 0.01129 | 0.01706 | 0.00094 | 0.00000 | 0.00000 | 0.03188 |
| SSE | 0.00318 | 0.01823 | 0.02811 | 0.00459 | 0.00012 | 0.00000 | 0.05422 |
| S | 0.00459 | 0.02494 | 0.03905 | 0.00553 | 0.00012 | 0.00000 | 0.07422 |
| SSW | 0.00365 | 0.02658 | 0.02811 | 0.00576 | 0.00012 | 0.00000 | 0.06422 |
| SW | 0.00353 | 0.02070 | 0.05622 | 0.01517 | 0.00188 | 0.00000 | 0.09751 |
| WSW | 0.00635 | 0.02623 | 0.06293 | 0.03117 | 0.00741 | 0.00000 | 0.13409 |
| WSW | 0.00612 | 0.02752 | 0.04987 | 0.02188 | 0.00600 | 0.00012 | 0.11150 |
| WNW | 0.00718 | 0.01988 | 0.02917 | 0.01294 | 0.00929 | 0.00012 | 0.07857 |
| NW | 0.00694 | 0.02200 | 0.01741 | 0.00388 | 0.00165 | 0.00000 | 0.05187 |
| NNW | 0.00376 | 0.01823 | 0.01023 | 0.00129 | 0.00035 | 0.00000 | 0.03388 |
| Total | 0.06587 | 0.33169 | 0.44813 | 0.12573 | 0.02835 | 0.00024 | 1.00000 |

**Table A.15 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the 61m Level Central Climatology Tower, Summer 2006**

| | Wind Speed Category, meters/sec | | | | | | |
|---|---|---|---|---|---|---|---|
| Sector | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | Total |
| N | 0.003784 | 0.011924 | 0.009402 | 0.000803 | 0.000229 | 0.000000 | 0.026142 |
| NNE | 0.003554 | 0.021325 | 0.022013 | 0.003440 | 0.000000 | 0.000000 | 0.050332 |
| NE | 0.004586 | 0.032332 | 0.031529 | 0.001376 | 0.000229 | 0.000000 | 0.070052 |
| ENE | 0.006306 | 0.029466 | 0.013529 | 0.003210 | 0.001834 | 0.000000 | 0.054345 |
| E | 0.003440 | 0.030039 | 0.013414 | 0.001949 | 0.000000 | 0.000000 | 0.048842 |
| ESE | 0.004930 | 0.029007 | 0.014446 | 0.000803 | 0.000000 | 0.000000 | 0.049186 |
| SE | 0.007567 | 0.028663 | 0.016625 | 0.000917 | 0.000000 | 0.000000 | 0.053772 |
| SSE | 0.009631 | 0.040014 | 0.047352 | 0.002866 | 0.000344 | 0.000000 | 0.100207 |
| S | 0.008714 | 0.048727 | 0.059161 | 0.002522 | 0.000115 | 0.000000 | 0.119239 |
| SSW | 0.012039 | 0.052396 | 0.030498 | 0.001376 | 0.000229 | 0.000000 | 0.096538 |
| SW | 0.009287 | 0.052855 | 0.026714 | 0.001605 | 0.000115 | 0.000000 | 0.090576 |
| WSW | 0.009745 | 0.053199 | 0.026370 | 0.004242 | 0.000000 | 0.000000 | 0.093556 |
| WSW | 0.006306 | 0.041046 | 0.021784 | 0.001949 | 0.000229 | 0.000000 | 0.071314 |
| WNW | 0.004815 | 0.019147 | 0.009860 | 0.002408 | 0.000573 | 0.000000 | 0.036803 |
| NW | 0.008255 | 0.010663 | 0.002064 | 0.000115 | 0.000229 | 0.000000 | 0.021326 |
| NNW | 0.004930 | 0.008943 | 0.003669 | 0.000229 | 0.000000 | 0.000000 | 0.017771 |
| Total | 0.107889 | 0.509746 | 0.348430 | 0.029810 | 0.004126 | 0.000000 | 1.000001 |

**Table A.16 - Joint Occurrence Frequencies of Wind Direction Sector by Wind Speed Category for the 61m Level Central Climatology Tower, Fall 2006**

| | Wind Speed Category, meters/sec | | | | | | |
|---|---|---|---|---|---|---|---|
| Sector | 0-2 | 2-4 | 4-6 | 6-8 | 8-12 | >12 | Total |
| N | 0.005673 | 0.024347 | 0.023165 | 0.005319 | 0.001182 | 0.000000 | 0.059686 |
| NNE | 0.004609 | 0.027065 | 0.026947 | 0.006855 | 0.000709 | 0.000000 | 0.066185 |
| NE | 0.004609 | 0.036402 | 0.035220 | 0.007328 | 0.000236 | 0.000000 | 0.083795 |
| ENE | 0.005555 | 0.035811 | 0.057085 | 0.005909 | 0.000000 | 0.000000 | 0.104360 |
| E | 0.005555 | 0.034866 | 0.039357 | 0.001064 | 0.000000 | 0.000000 | 0.080842 |
| ESE | 0.004728 | 0.028838 | 0.024347 | 0.001182 | 0.000000 | 0.000000 | 0.059095 |
| SE | 0.004018 | 0.023638 | 0.019974 | 0.002246 | 0.000000 | 0.000000 | 0.049876 |
| SSE | 0.005437 | 0.019856 | 0.023401 | 0.003073 | 0.000946 | 0.000000 | 0.052713 |
| S | 0.003900 | 0.015601 | 0.019383 | 0.002246 | 0.000473 | 0.000000 | 0.041603 |
| SSW | 0.003191 | 0.016192 | 0.016310 | 0.001418 | 0.000118 | 0.000000 | 0.037229 |
| SW | 0.001655 | 0.012292 | 0.015365 | 0.000827 | 0.000118 | 0.000000 | 0.030257 |
| WSW | 0.003073 | 0.018083 | 0.018556 | 0.005791 | 0.001891 | 0.000000 | 0.047394 |
| WSW | 0.004846 | 0.034629 | 0.037348 | 0.013946 | 0.002482 | 0.000000 | 0.093251 |
| WNW | 0.004964 | 0.031202 | 0.027420 | 0.013119 | 0.004137 | 0.000000 | 0.080842 |
| NW | 0.010164 | 0.032738 | 0.014419 | 0.002600 | 0.000118 | 0.000000 | 0.060039 |
| NNW | 0.006973 | 0.028956 | 0.012883 | 0.003782 | 0.000236 | 0.000000 | 0.052830 |
| Total | 0.078950 | 0.420516 | 0.411180 | 0.076705 | 0.012646 | 0.000000 | 1.000000 |