Guide to Mesonet Monthly Climatological Data

Updated April 8, 2009

Site Information:

Site Name- The site name is usually the nearest incorporated city. Each site also is designated by a unique 4-letter ID. The distance to the nearest town is listed in miles.

Latitude and Longitude- The latitude and longitude of each station were determined to the nearest second from Global Positioning System (GPS) units. The numbers listed are degrees, minutes, and seconds, separated by dashes. For example, 36-41-25 is 36 degrees, 41 minutes, and 25 seconds.

Daily Data (from left to right):

Temperatures (° Fahrenheit)- Maximum and minimum temperatures show the highest and lowest 5-minute temperature observations reported during each calendar day (CST). True maximum and minimum temperature may differ slightly, but the 5-minute resolution will be very close. Average daily temperature is determined using all available 5-minute observations during the day. It is calculated by adding all of the temperature observations and dividing by the number of observations for the day.

Dew Point (° Fahrenheit)- The dew point is the temperature to which the air would have to be cooled to form dew. It is derived from measurements of temperature and relative humidity and provides an estimate of the amount of moisture in the air. Dew point is calculated for each 5-minute observation and then averaged over the day.

Degree Days- Heating degree days (HDD) and cooling degree days (CDD) are measures of the amount of heat which has to be added to (heating) or removed from (cooling) the air to provide a "comfortable" temperature. Degree days measure the departure of a day's average temperature from a base of 65 degrees. If the average temperature is below 65 degrees Fahrenheit, heating degree days are added; if it is above 65 degrees, cooling degree days are added as follows:

HDD = 65 - mean temperature
CDD = mean temperature – 65

Relative Humidity (Percent)- Maximum and minimum relative humidity are the highest and lowest values, respectively, from any of the 5-minute observations during the day (CST). Average relative humidity is the average of all 5-minute values from the entire 24-hour period.

Rain (Inches)- The rain values are the 24-hour (CST) rainfall totals. Totals may include any frozen precipitation (snow, ice, hail) which may accumulate in the gauge and then melt during the current day. (There is no reliable and affordable means of automating snow measurements.) Frozen precipitation can not be

recorded until it melts; therefore, precipitation from snow may not be recorded until several days after the snow event.

Pressure (Inches of Mercury)- The pressure values are the average daily value (CST) of air pressure measured at the station (STN) and an estimated value corrected to Mean Sea Level (MSL). The reason for the latter category is that pressure is very sensitive to even small changes in elevation. To compare pressure between sites, the observations have to be made (or estimated) at a common level, in this case sea level.

Wind (Miles per Hour)- The direction listed is the most common wind direction for the day. Each 5-minute observation of wind direction is recorded as from one of the 16-point compass headings, and the heading with the highest number of observations at the end of the day is listed on the form. Wind speed is an average of all 5-minute observations during the day and is not dependent on the direction. The maximum wind speed is the highest recorded observation from any 3-second measurement.

Solar Radiation (MegaJoules per Square Meter)- The solar radiation readings reported by the Mesonet are the rate of solar energy hitting a square meter of the earth's surface. Because the values are zero during nighttime, an average of the 5-minute reports would not provide much information. Therefore, the 5-minute rates are converted to a 5-minute accumulation of energy. [Multiplying by 300 seconds for the 5-minute observation period converts Watts (Joules per second) to Joules.] These 5-minute accumulations then are summed for the entire day, yielding the total energy received over a square meter from the sun during the day (expressed in MegaJoules per square meter). An analogy is a car's speedometer and odometer. The speedometer measures a rate of travel while the odometer measures the total distance traveled. The rates reported by the Mesonet stations are like the speedometer while the accumulations presented in the summary are like the odometer. Factors which may affect the solar energy accumulation include clouds, dust, smoke, fog, or other particles in the air.

Soil Temperatures (° Fahrenheit)- Observations are recorded at a depth of 10 centimeters (4 inches) under both bare soil and native vegetation (sod). The sod and bare soil temperatures are daily averages from all observations for the day, taken at 15-minute intervals. The maximum and minimum values are from the bare soil temperature readings, which typically show more variability than the sod temperatures because the sod acts as insulation.

Monthly Data:

Monthly Averages- Numbers along the bottom of the daily columns show an average of all the values in the column above it (with the exception of maximum wind speed, which is the extreme for the month). For example, the maximum temperature is an average of the daily maximum temperatures. The prevailing

wind is determined, as in the daily observations, by counting the number of observations for each compass heading during the entire month and then listing the most frequently observed wind direction.

Temperature- This value shows the highest and lowest of the daily maximum and minimum temperatures for the specific Mesonet site during the month.

Degree Days- This value is a monthly accumulation of all of the daily degree day values.

Rainfall- Total rainfall is a sum of the daily rainfall totals. The greatest 24-hour rainfall is the highest single-day total during the month.

Humidity- This value shows the highest and lowest of the daily maximum and minimum relative humidity values.

Number of Days With- This table provides a quick-glance count of the number of days on which certain weather conditions were recorded. Included are a count of the number of days on which the maximum temperature equaled or exceeded 90 degrees (Tmax ≥ 90), the maximum temperature was at or below freezing (Tmax ≤ 32), the minimum temperature was at or below 32 degrees (Tmin < 32), and the minimum temperature was at or below zero (Tmin < 0). It also shows the number of days on which precipitation was recorded (Rainfall ≥ 0.01 inch) or was over one tenth of an inch (Rainfall > 0.10 inch).

Lastly, it provides a count of the number of days on which the average wind speed was over 10 mph or the maximum wind speed exceeded 30 miles per hour.

Missing Data:

Asterisk(*)- An asterisk in a data cell indicates that at least one observation is missing for that day but less than 10% of the observations are missing.

Not Available (NA)- An "NA" in a data cell indicates that 10% or more of the observations are missing for that day. These rare data outages can occur if lightning strikes the site, a sensor malfunctions, or vandalism occurs.