INTERPRETATION ARTICLE

The previous article entitled “How Does a Tree Change Its Stripes?” explained how leaves change their color. Weather conditions play a vital role in the range of autumn colors displayed. Too much wind causes the leaves to fall off early. Too much rain produces diseases which attack the leaves. Once trees are left with a large number of healthy leaves, the two determining factors in the color are temperature and sunlight.

Temperature Impacts

For bright red leaves, temperatures should be warm during the day and cool at night. Freezing temperatures are bad news for leaf-watchers. Trees will drop their leaves quickly once they experience freezing temperatures.

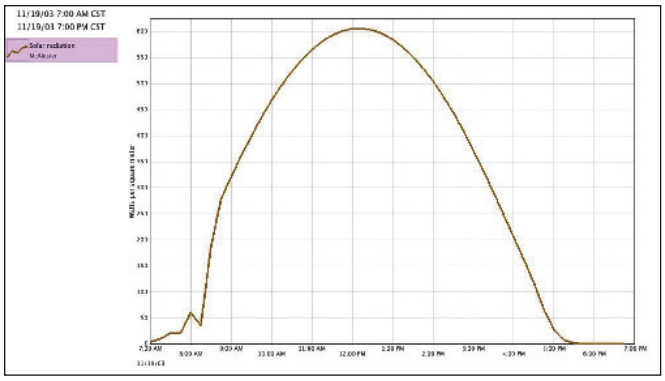
Sun Impacts

Clear skies are extremely important for colorful autumn leaves. Clear daytime skies allow the sun to heat the earth’s surface, which increases the air temperature. Clear nighttime skies allow the earth’s surface to cool rapidly. Several days or weeks with these conditions produce red, purple, and crimson colors that join the normal yellows, golds, and oranges.

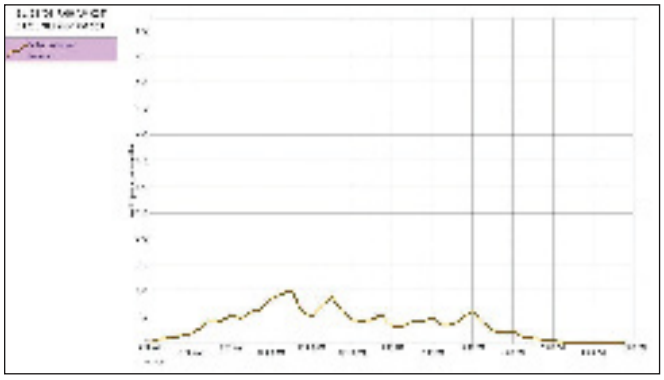
Solar Radiation (SRAD)

The Oklahoma Mesonet is a useful tool to help you anticipate when the leaves will begin turning colors and when to expect the leaves to begin falling. Solar radiation is a measurement of the amount of sun energy absorbed by the earth’s surface. For a given time of the year, clear skies will produce relatively high solar radiation values as compared to cloudy skies. Comparing typical autumn solar radiation values with visible satellite images can help you determine which solar radiation values are produced when clouds are present in the atmosphere.

A graph of solar radiation is a quick way to determine cloud cover. The smooth curve of Graph 1 depicts a clear day. The jagged line of Graph 2 shows how much less solar radiation is collected when clouds move over the instrument.



Graph 1



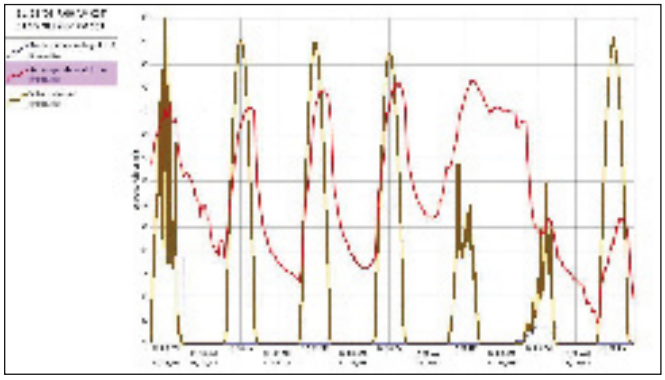
Graph 2

Classroom Activity

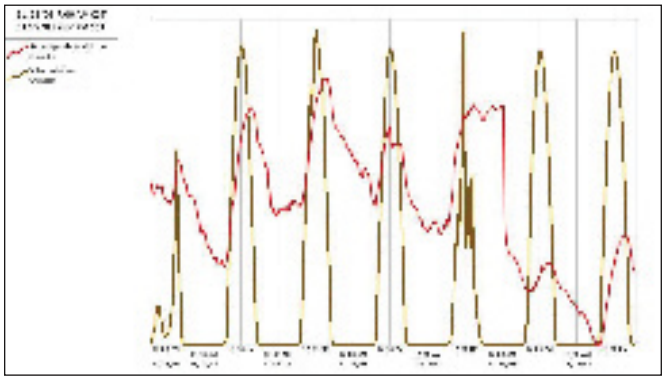
Oklahoma is often referred to as a transition zone. The wide range of temperature and precipitation values result in a diverse range of plant species. Eastern Oklahoma is much like the eastern U.S. with a large variety of trees and other plants requiring a modest amount of rainfall. As you travel to western Oklahoma, you encounter fewer trees and more grasses.

In this activity, we will look back on the autumn of 2003 at two Mesonet sites: Broken Bow and Chandler. Broken Bow is located in far southeast Oklahoma in a highly forested area. Chandler is in east central Oklahoma on the edge of the Cross-Timbers region, where the trees begin to thin.

On the graphs below, the brown line is solar radiation and the red line is temperature. The graphs begin on November 18th at 7 am and end on November 24th at 7 pm. Graph A is from Broken Bow and Graph B is Chandler.



Graph A *– Solar radiation, rainfall, and temperature from Broken Bow*



Graph B *– Solar radiation and Temperature from Chandler*

1. How many clear days did Broken Bow have? Chandler?

2. What percent of clear days did Broken Bow have? Chandler?

3. What percent of cloudy days did Broken Bow have? Chandler?

4. What was the temperature range at Broken Bow for the period of the graph? For Chandler?

5. Which site received the most total solar radiation for the week? Explain why you chose this site.

6. Which site do you believe had the widest range of autumn leaf colors? Explain why you chose this site.

7. Did anything happen during the week that might have interfered with the leaf colors? What happened? Did this occur at both sites?

8. Which impacts leaf color the most: the number of clear autumn days, the range of daily temperatures, or reaching a specific temperature over night? Test your theory by collecting data this fall.

FALL 2004 in _____ (your home town)

Pick a tree in your backyard or on the school playground and record your observations below:

a) Date leaves begin to turn
b) Date of first freeze
c) Date leaves begin to fall
d) Date last leaf falls

Submit your data to andrea@mesonet.org . Results will be posted at http://k12.ocs.ou.edu/