Finding Fronts on the Oklahoma Mesonet

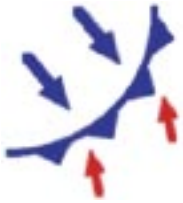
http://earthstorm.ocs.ou.edu

Mesonet Information:

The Mesonet is a network of over 110 weather stations across the state of Oklahoma, with at least one station in every county. These stations measure air temperature, relative humidity, wind speed, wind direction, soil temperature, barometric pressure, and rainfall. This network helps users see the current weather conditions near their location and see weather trends across the state.

What is a Cold Front and How Does Knowing its Location Help?

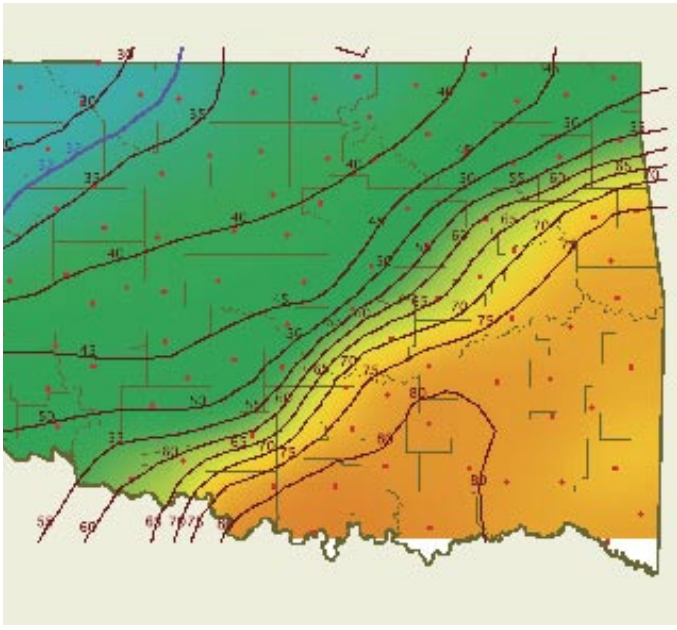
A cold front is a transition zone between warmer and colder air, where the colder air replaces the warmer air. Knowing where a front is relative to your location can assist your decision on what to wear, how to modify outdoor activities, or crop dust. If a front brings in very cold air, it will kill pests and other insects. It will also mean livestock will need more food and warmer barns.



With a cold front comes wind shifts. This is important to know about when irrigating, crop dusting, or having a prescribed burn. Precipitation is often at the leading edge of a cold front. Knowing the temperature of the cold air can indicate what type of precipitation to expect. The following information discusses how to interpret Mesonet data so weather fronts can be tracked across the state.

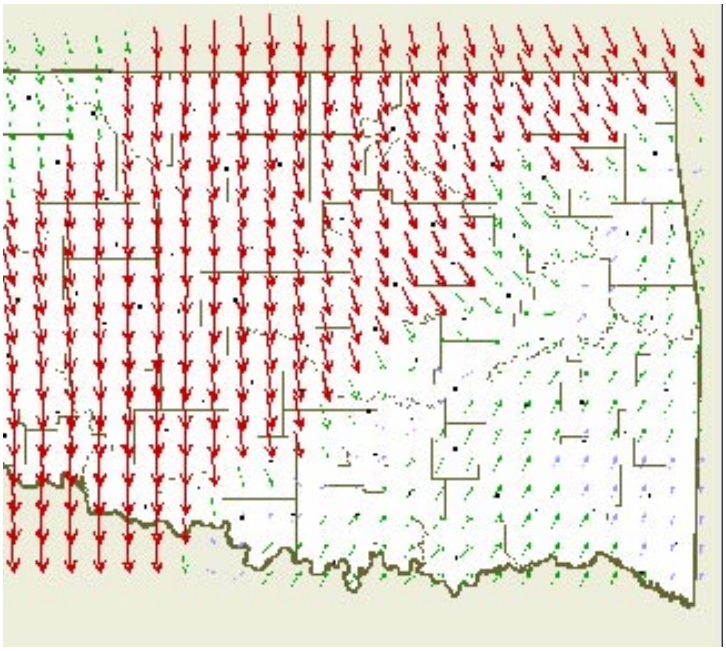
How do I Find the Front?

Because the Oklahoma Mesonet is a dense network of weather stations, it is easier to locate fronts on the Oklahoma Mesonet than with other weather station systems. The Oklahoma Mesonet is a resourceful tool to locate and track cold fronts.



To locate a front, one of the first products to look at is air temperature. Go to http://earthstorm.ocs.ou.edu, choose Data, Weather Data, OK Mesonet, Contour and Vector Maps, then Air Temperature. Tightly-packed contour lines indicate a rapid change in temperature over an area. In the example to the left, the front has just passed Tulsa, Oklahoma City and Lawton.

A second way to identify a cold front is wind direction. Choose Data, Weather Data, OK Mesonet, Contour and Vector Maps, then Wind Vectors. Winds at the front are very calm. One can judge how fast the front



is moving based on wind speed. In the example to the left, the winds moving to the southeast are much stronger than the winds where the front has not yet passed.

An excellent way to see a front move through the state is to animate the winds or the air temperature. To animate air temperature, choose Data, Weather Data, OK Mesonet, Color-Contour Animations, then Air Temperature. This shows the air temperature changing as the front moves through over the previous two hours. To animate wind vectors, choose Data, Weather Data, OK Mesonet, Color-Contour Animations, then Wind Vectors. This can be used to show the animation of the winds shifting as a front moves across the state.

What about Soil Temperature?

Cold fronts are more devastating in spring and winter than any other time of year. Cold fronts that bring in freezing temperatures cause the soil temperature to drastically drop. Compare the two maps below. The one on the left shows the front just as it passed Oklahoma City at 4:45 pm. The soil temperature 2 inches below the surface was 65°F at Norman. At 11 pm the same night, the soil temperature was 40°F. Such a significant drop in soil temperature in a short time can be tragic for plants. Being able to track a cold front can help determine how crops should be handled before the soil reaches destructive temperatures.