

OK-FIRE WORKSHOP - LAB EXERCISE #1

Home Page and FIRE WEATHER Products

Using the browser of your choice, go to the OK-FIRE module (<https://www.mesonet.org/index.php/okfire>) on the Mesonet website

HOME PAGE

The home (landing) page is where you customize OK-FIRE to make a chosen Mesonet station the default station throughout the entire OK-FIRE module. OK-FIRE also allows you to choose a second station on the home page for display of current weather, dispersion, and fire danger conditions alongside the primary (default) station.

Select a Mesonet station in your geographical area of interest by clicking the Mesonet station that is currently showing in the “Station” field to the right of the regional relative humidity and wind direction map. On the map that appears, select your default station by either clicking on the desired Mesonet site or clicking on the station name in the pull-down menu. You’ll notice the station now changes to your selected station on the home page. This is now your PRIMARY (default) station. The latest weather, dispersion, and fire danger conditions are listed below the station name in the “Weather” section of the one-column table. Note that “-” in a data field indicates missing data. Also notice that OK-FIRE shows two zoomed-in regional maps centered about your primary station; one map shows current relative humidity and wind direction; the other one, current burning index.

a) *What is the current relative humidity (RH) at your default Mesonet station?*

What is the change in RH during the past hour?

What is the time of the observation?

b) *What is the wind speed and direction at 10-m height? What is the current maximum wind gust?*

c) *Has there been any rainfall the past 24 hours? If so, how much?*

(Note: This can also include melting snow, since Mesonet’s rain gages are not heated)

d) *What are today’s sunrise and sunset times for that Mesonet location?*

Now try adding a second station to the home page. Click the + symbol underneath “Add a Station”. On the map that appears, select your secondary station by either clicking on the desired Mesonet site or clicking on the station name in the pull-down menu. You’ll notice the second station along with its most current data now appears on the home page in a column to the right of the primary station. The two regional maps, however, remain centered on the primary station.

Finally, note that you can click on a given variable name in the station data tables and it will take you to the most current statewide map for that variable. Try clicking on “10-m Wind”. To get back to the home page from this location or any place you are in OK-FIRE, just click on the OK-FIRE logo within the black horizontal bar at the top of the page.

CURRENT Fire Weather

Besides the home page, where you can see current weather conditions listed for up to two stations, as well as a regional RH and wind direction map centered on your default station, you can also go to “Current Station Conditions” and “Current Maps”, the first two items in the left menu section.

Current Station Conditions

Click on “Current Station Conditions” in the left menu. This takes you to a section where you can see ALL of the weather, dispersion, and fire danger conditions for a given station. The data shown on the home page is limited and there we only show the variables deemed most important. Here you can change to ANY Mesonet station without it affecting the station(s) showing on the home page.

Select a Mesonet station that is different from the stations on the home page. To do this, first click on the Mesonet station name currently showing. On the map that appears, select your station by either clicking on the desired Mesonet site or clicking on the station name in the pull-down menu. You'll notice the station now changes to your selected station. Notice that there are some new variables here.

- a) ***What is the change in RH during the past 3 hours?***

- b) ***What is today's maximum RH? This variable shows the maximum RH since midnight, which is useful to see if fine dead fuels have had time to recover (increase) their moisture in the overnight period.***

- c) ***What is the 2-m wind speed?***

Current Maps

Now go to the “Current Maps” section by clicking on that link in the left menu section. Here are listed ALL the current maps in the OK-FIRE module – note they are grouped in sections: “Fire Weather”, “Fire Danger”, “Satellite”, and “Local Radar”.

Click on the first map, “Current Fire Weather Conditions”.

- a) ***What are the temperature, relative humidity, and wind conditions in Texas County (the central county in the panhandle)? (please note that winds blow in a direction along the staff from the barbed end toward the dot representing the Mesonet site)***

- b) ***In what section(s) of the state are the winds the strongest? What is their direction?***

Go back to “Current Maps” and look at the “Relative Humidity and Winds” map, a very useful map that combines RH with wind direction.

- c) ***Is there evidence of a dry line anywhere in the state? If so, where is it located? What part of the state has the lowest relative humidity at this time?***

Go back to “Current Maps” and now look at the 10-m winds. Select the “Wind Speed and Direction” map.

- d) ***Is there any evidence of a front or wind-shift line in the state? If so, where is it located?***

PAST Fire Weather

Let's say you wanted to see recent trends in statewide weather conditions or at a specific Mesonet site. Where would you go to get this information?

Maps

For recent trends in statewide weather conditions, click on "Past & Forecast Animated Maps" in the left menu section. Click on "Past". The default duration for PAST is "Past 24 Hrs", but you can set it to as little as "Past 3 Hrs" or as much as "Past 30 Days" for weather variables. As far as which map to display, the default is "Relative Humidity and Winds", but you can choose any variable in the pull-down Variable menu.

For purposes of illustration, let's choose "10-m Winds" as the Variable and "Past 6 Hrs" as the Duration. Beneath the map are the animation buttons. Click on the middle button (Play) to animate the map over the past 6 hours.

How, if at all, have the winds changed over the past 6 hours in your area of interest?

Note that the middle button is a toggle between Play and Pause. If you hit Pause, you can advance one frame at a time by clicking the fourth button. You can go backward one frame at a time by clicking the second button. Clicking the first button will take you to the first frame of the animation, and clicking the last button will take you to the last frame of the animation. Finally note you can speed up or slow down the animation by moving the solid circle on the Speed Bar.

Charts/Tables

For recent trends at a particular Mesonet site, click on "Past & Forecast Charts/Tables" in the left menu section. Click on "Past" in the "Time Mode" section. Your default (primary) Mesonet station will be the one showing up on this page. If you wish to change the station, however, you can do so in the same way as before (this will NOT affect the station(s) on the home page). Let's keep it on your default station.

The default "Display Mode" is CHARTS. Let's stick with that for now. For weather conditions, the default "Standard Meteogram" is the Variable to use. Note you can set the Duration ("Past 24 Hrs" is the default) to as recent as "Past 3 Hrs" or as far back as "Past 30 Days". Let's stick with the past 24 hours. At this point, click "Get Data" at the bottom.

The chart for the most important weather variable (RH) is shown first (along with rainfall since 00 GMT; CST = GMT - 6 hrs; CDT = GMT - 5 hrs), followed by a chart for the second most important variable (Wind), including average wind speeds and directions, and wind gusts. The remaining two charts are for air temperature and dewpoint, and solar radiation.

- a) ***What was the lowest relative humidity (1st graph, green line) over the past 24 hours at this station and what time(s) did it occur? (Note you can put your cursor on the graph curve and it will show you the values of all values displayed and the day/time it occurred)***

- b) ***What was the highest wind gust (2nd graph, purple) over the past 24 hours? What were the wind directions (wind barbs) at that time? (please note that winds blow in a direction along the staff from the barbed end toward the dot at the top of the blue wind speed curve)***

FORECAST Fire Weather

OK-FIRE NAM Forecast Products

OK-FIRE utilizes the latest 84-hour NAM (North American Mesoscale Forecast System) numerical forecast in its products. Go back to the home page. The latest NAM forecast being used is shown above the 12-hr forecast charts below the two regional maps and data tables. The forecasts are updated every 6 hours.

- a) What NAM forecast is currently being used?***
- b) When is the next update expected?***

Home Page 12-Hour Forecast Charts

Note that on the home page there are two 12-hour forecast charts for the default station, and another two charts for the secondary station, if there is one. The first chart shows the important fire weather variables, that is, relative humidity and winds. The second shows Burning Index and 1-hour precipitation.

- a) For your default station, what is the lowest relative humidity that is forecast over the next 12 hours and when does it occur?***
- b) What is the highest sustained wind speed expected over the next 12 hours and when does it occur? What are the wind directions at that time?***
- c) Is any precipitation (e.g., rainfall, ice, snow) predicted over the next 12 hours? If so, when will this occur?***

Forecast Maps

To see statewide forecast maps, go to “Past & Forecast Animated Maps” in the left menu section. The default mode is “Forecast” so you don’t need to change that. The default map is “Relative Humidity and Winds”, but you can choose any map in the Variable pull-down menu.

Let’s run the 84-hour forecast map animation for “Relative Humidity and Winds”. As we discussed for the Past mode, click on the middle button (Play) beneath the map to start the animation through the 84-hour forecast period.

- a) On what days does the lowest relative humidity occur? In what part of the state do these low values occur and how low do they get? Is there any evidence of a dry line?***

Let’s now look at 10-m Winds. Choose “10-m Winds” in the pull-down Variable menu. Click on the Play button below the map.

- b) Over this 84-h period, where in the state do the strongest winds occur and what are their approximate speeds and directions? When do these max winds occur?***

Forecast Charts and Tables

Forecast weather variables for specific Mesonet stations are available in both chart and table format. To see either, click on “Past & Forecast Charts/Tables” in the left menu section. Your default (primary) Mesonet station will be the one showing up on this page. If you wish to change the station, however, you can do so in the same way as before (this will NOT affect the station(s) on the home page). Let’s keep it on your default station.

“Forecast” is the default “Time Mode”, so nothing is needed to change there. “Charts” is the default “Display Mode”, so let’s keep it there for now. “Next 84 Hours” is the default Duration, which is the full extent of the NAM forecast. For weather variables, keep the Variable as “Standard Meteogram”, which is the default. Hit “Get Data” and you’ll see the same meteograms as in the Past mode, with the exceptions that in forecast mode 1-hr precipitation replaces rainfall since 00 GMT and wind gusts are currently not available.

- a) ***What is the lowest relative humidity (1st graph, green line) expected and on what day(s) does it occur?***
- b) ***What are the highest predicted wind speeds (2nd graph, blue) and on what day(s) do they occur? What are the corresponding wind directions?***
- c) ***Is any precipitation (1st graph, blue) predicted? If so, when is it expected to occur?***

Now let’s look at the TABLE format. Go back to “Past & Forecast Charts/Tables” and click on “Tables” as the “Display Mode”. Leave the Variable on “Fire Weather”. Again the default duration is “Next 84 Hours”. Click on “Get Data” to see the forecast table over the next 84 hours.

Note that the predicted weather variables over the next 84 hours are shown at a 1-hour display interval. Look in particular at tomorrow’s forecast. To make this easier, set the “rows per page” at the bottom of the current table to 50. Then you can scroll downward to see tomorrow’s forecast.

- d) ***What is the lowest relative humidity (RELH) predicted for tomorrow and during what hour(s) does it occur? (Please write this down as you will be comparing it later with the NWS forecast)***
- e) ***What are the predicted wind speeds (WSPD) and directions (WDIR) during those times of lowest relative humidity? (Please write this down also as you will be comparing it later with the NWS forecast)***

National Weather Service Forecasts

The OK-FIRE forecast products are based solely on the NAM model. *As no one model is ever perfect, you are strongly encouraged to check the “official” forecasts from the National Weather Service (NWS) office serving your area. Check for consistencies or inconsistencies with the weather predictions of the NAM forecast.* NWS forecasters look not only at the NAM model, but also other models as well, and together with their experience, offer their best forecast.

To make it easy to compare, in the left menu section of OK-FIRE, you will find direct links to the NWS chart and table forecasts for the default Mesonet station on the home page.

Let's first click on the "NWS Forecast Chart" link for the default station. Like our OK-FIRE meteograms, the NWS uses the wind barb format to portray wind direction. Note you can also put your cursor anywhere on the graphs and the values of all variables on all charts along with the date/time will be shown below the last chart.

Look at the NWS forecast for tomorrow.

- a) ***What is the lowest relative humidity forecast for tomorrow (3rd graph, green line) and what hour(s) does it occur?***

- b) ***What are the forecast wind speeds and directions (2nd graph, purple line) during that hour or hours? (please note that wind gusts, if any, are plotted above the purple sustained wind speed line)***

- c) ***How does this NWS forecast for lowest RH and accompanying winds tomorrow compare to the NAM model (OK-FIRE) forecast for these same variables that you already noted on the page before this? Are there any major discrepancies?***

Note that to make the NWS charts easier to view, you can deselect any plotted variable, such as "Dewpoint", "Sky Cover", and "Thunder" by clicking their checked boxes at the top, which will uncheck those boxes. Also note that here, and in the NWS table forecast (which we don't have time to go to), to proceed further into the forecast, you need to click "Forward 2 Days" at the upper right of the top graph.

NWS Fire Advisories and Outlooks

Finally, with respect to fire weather alone, OK-FIRE provides a link in the left menu section to "Fire Advisories and Outlooks" issued by the National Weather Service. You'll find Oklahoma and national maps for fire weather advisories (fire weather watches, red flag warnings, and dense smoke advisories), as well as fire weather outlooks for Day 1 and Day 2.

Click on the "Oklahoma Fire Weather Advisories" map.

- a) ***Are there any current Fire Weather Watches or Red Flag Warnings for Oklahoma? If so, for what part of the state?***

Note a "Fire Weather Watch" is typically issued 12-48 hours (can be up to 72 hours) in advance of expected dangerous conditions. A "Red Flag Warning" is issued for dangerous fire conditions within the next 24 hours. A "Red Flag Warning" is the highest fire alert that the National Weather Service issues.

Go back and now click on the "National Fire Weather Advisories" map.

- b) ***Are there any current Fire Weather Watches or Red Flag Warnings for the lower 48 states? If so, for what sections of the country?***