Radar Interpretation

http://earthstorm.ocs.ou.edu

Basic Radar Information:

The Radar section on the EarthStorm site allows you to view current weather radar from 15 Doppler radars in the south-central region of the United States along with regional and national radar mosaics. The National Weather Service operates the radar in two modes: clear-air mode and precipitation mode. Clear-air mode is used when there is no rainfall or there is a freezing precipitation event. Precipitation mode is used when there is rainfall.

The radar senses energy from the radar beam that is reflected back to the radar by various targets in the atmosphere. The targets in the atmosphere can be precipitation (like raindrops, hailstones, snowflakes, or sleet particles) or they can be non-meteorological (such as birds, insects, or bats). The most common radar image is called reflectivity which is related to the type of targets and their size. Hail and heavy rainfall with large drops produce the largest values of reflectivity. Values of reflectivity lower than 20 dBZ are usually not liquid raindrops.

In precipitation mode, shown right, the radar shows higher values of reflectivity, where the scale is from 0 to 75. In clear-air mode, shown below, the scale has values from -28 to +28 (less energy is reflected to the radar by non-meteorological targets than by raindrops). The radar data are updated every 10 minutes in clear-air mode and every 4 to 6 minutes in precipitation mode.

Preciptation Mode

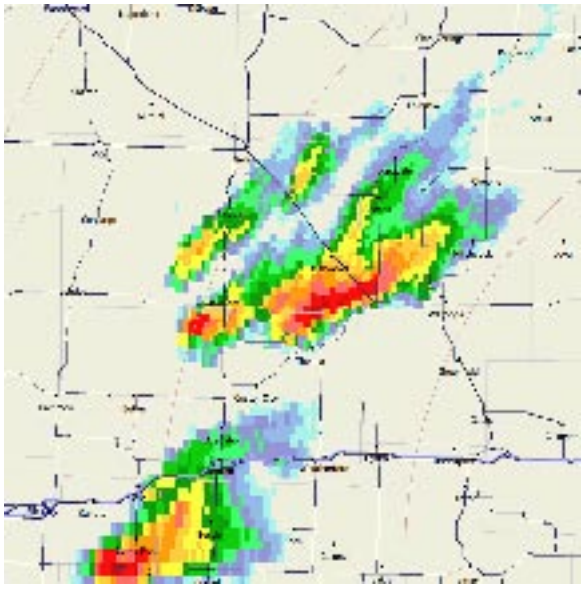
Clear-Air Mode

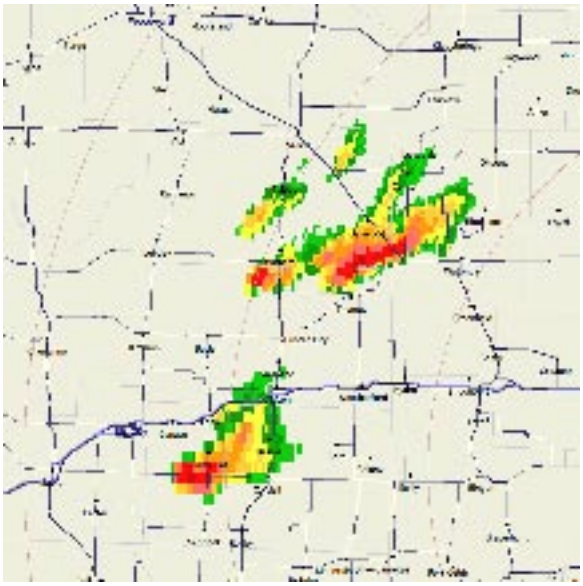
Because of the curvature of the earth, the farther away the beam gets from the radar, the higher the beam is above the earth. The beam also broadens as it gets farther away from the radar, so storms at far ranges appear less defined. In other words, the exact same thunderstorm can appear differently if it is located closer to the radar, rather than far away. It is usually best to choose a relatively close radar, if possible. Therefore, when storms are a few hundred miles to the north of the Oklahoma City radar, it would be a good idea to look at the Wichita, Kansas, radar to get a better idea of the severity of the storms.

To use Radar, go to earthstorm.ocs.ou.edu, select Data, click on Weather Data, then Radar.

Radar Interpretation:

Radar can be used to get an idea of how hard it rains. Generally speaking, reflectivity values lower than about 35 dBZ are light rain; values between 35 and 50 dBZ are moderate rain; and values above about 50 dBZ are heavy rain. Reflectivity values above about 55 dBZ are usually hail. To get a closer look at a specific spot on the radar, zoom in by left-clicking on the mouse. To zoom out, right click on the mouse. To zoom out on an Apple computer, hold down the option key and click on the mouse.





The legend on the radar image, above left, color-codes the reflectivity values. By clicking on a given color in the legend, the corresponding reflectivity values are toggled off and on in the radar image. The process of toggling the colors allows visual filtering to more easily focus on higher reflectivity values, which are usually more significant. The example, above center, demonstrates how the radar appears with all color codes, while the image above right demonstrates radar with the first four color codes toggled off.

The EarthStorm website provides radar loops, which are available by clicking the "Show Movie" button. Depending upon the radar's mode (precipitation versus clear-air) the animation displays between 30 minutes to an hour of data. Animated radar loops provide a good way to see storm motion.

Rain Rate vs. Reflectivity

Reflectivity (dBZ)	Rain Rate (inches/hour)
15	0.01
20	0.02
25	0.04
30	0.09
35	0.21
40	0.48
45	1.10
50	2.50
55	5.68
60	12.93

The chart to the left relates reflectivity values to the rate of rain falling in inches per hour. With the current technology of radar, cumulative rainfall totals are not 100% accurate; radar does best at delineating rainfall locations, but it struggles with the actual amounts. If you need accurate cumulative rainfall totals, compare the radar with Oklahoma Mesonet sites surrounding your area.

authors: Loren Gmachl, Dale Morris - Apr. 2004 edition