THE
ATMOSPHERICRESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

WHAT'S ON YOUR RADAR?

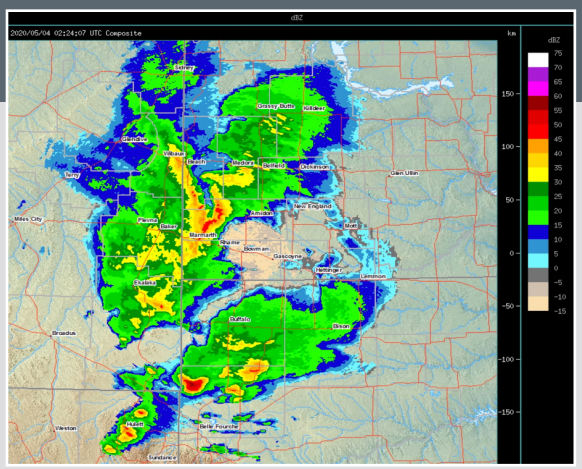

Figure 1

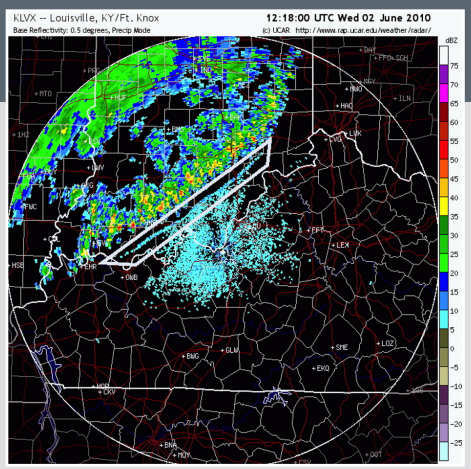

Figure 2

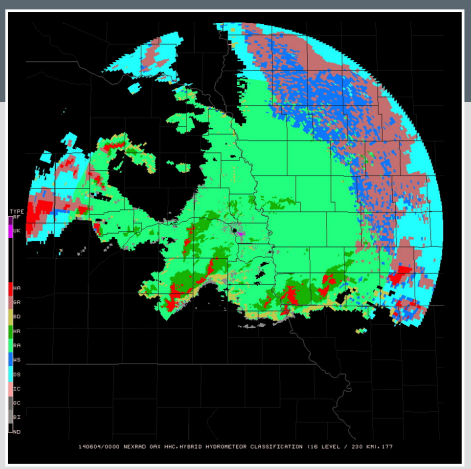

Figure 3

By Mark D. Schneider

North Dakotans pay special attention to weather radar this time of year. There are many features associated with radar images that require more analysis than just a quick glance. Just seeing the color red in the core of a thunderstorm isn't enough information to determine whether or not it contains hail, for example. The secret is to use a combination of radar products and look closely for specific shapes or signatures. For starters, let's look at a radar image of Bowman radar from last month. Figure 1 is what is commonly referred to as a reflectivity image. These are the most commonly viewed types of radar images because they display precipitation location and intensity. The "dBZ" scale on the right side of the image (from -15 to +75) is a measure of the returned power ("reflectivity") of a radar's beam in decibels. Because radar reflectivity is logarithmic, like the Richter Scale used to measure earthquakes, a 40 dBZ thunderstorm would actually be 10 times stronger than a 30 dBZ storm. Notice the word *Composite* in the top frame of the radar image. This signifies that the image you're looking at isn't just a picture of the sky from one angle that the radar dish is scanning, but a "sandwiching" or combination of the highest reflectivities of multiple angles. When you're accessing weather radar on your phone app or computer, *Base* reflectivity images are commonly displayed, showing the lowest angle of a radar's scan.

When we loop a series of radar reflectivity images, it's easier to see certain features. An example is a thunderstorm or line of thunderstorms producing a gust front. Figure 2 shows a line of storms with another weaker (light blue) line ahead of the storms with the same orientation. This area within the white boxed outline is known as a gust front (or outflow boundary) and arrives in advance of the storms and precipitation. A radar image loop on your phone app could give you an indication of how quickly the gust front is advancing and provide you time to prepare for the strong winds that are associated with it.

To help determine whether a thunderstorm contains hail, the National Weather Service (NWS) radars and the new radar at the Williston Basin International Airport have dual-polarization scanning technology. These radars send both horizontal and vertically oriented energy pulses into thunderstorms and are able to compare the returns to determine a more precise shape (i.e. hail being spherical) of the precipitation being sampled. Your phone app or computer might allow you to access what's called *Hydrometeor Classification*. Notice in Figure 3 that areas indicating hail are red in color. If you were to compare this image with a regular reflectivity image from the same time, it would be noticeable that not all red areas on the hydrometeor classification would match red areas on the reflectivity image.

This summer, weather radar will help North Dakotans remain alert and safe from hazardous weather conditions. Keep your eyes on your radar apps and the skies!

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