Radar Measurements

What is it?

Reflection of electromagnetic waves from a radar antenna by raindrops

Reflection strength =

f(number and size of drops)

Distance from radar site to the area =

f(time between pulse emission and receipt of echo)

Systems

NWS installed a network of 161 Doppler radar systems in the 1990's: NEXRAD for next generation radar. WSR88D was deployed jointly by USDOE, USDOD and USDOT.

Other systems are operated by FAA, among other agencies

Application

Estimates temporal intensities over large areas

Combined with rain gage data results in estimates between areas

Less accurate than gage measurements

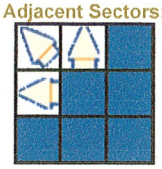
weather.gov

National Weather Service Enhanced Radar Mosaic

Southeast Sector

Go to: Standard Version Local weather forecast by "City, St" City, St Go

Adjacent Sectors:



Sectors

Northern U.S.

Pac. Northwest	Loop
Nrn. Rockies	Loop
Upper Miss. Vly.	Loop
Great Lakes	Loop
Northeast	Loop

Southern U.S.

Pac. Southwest	Loop
Srn. Rockies	Loop
Southern Plains	Loop
Srn. Miss. Vly.	Loop
Southeast	Loop

U.S. Views

Reflectivity:

National	Loop
Alaska	Loop
Hawaii	Loop
Guam	Loop
Puerto Rico	Loop

Radars by State

Go!

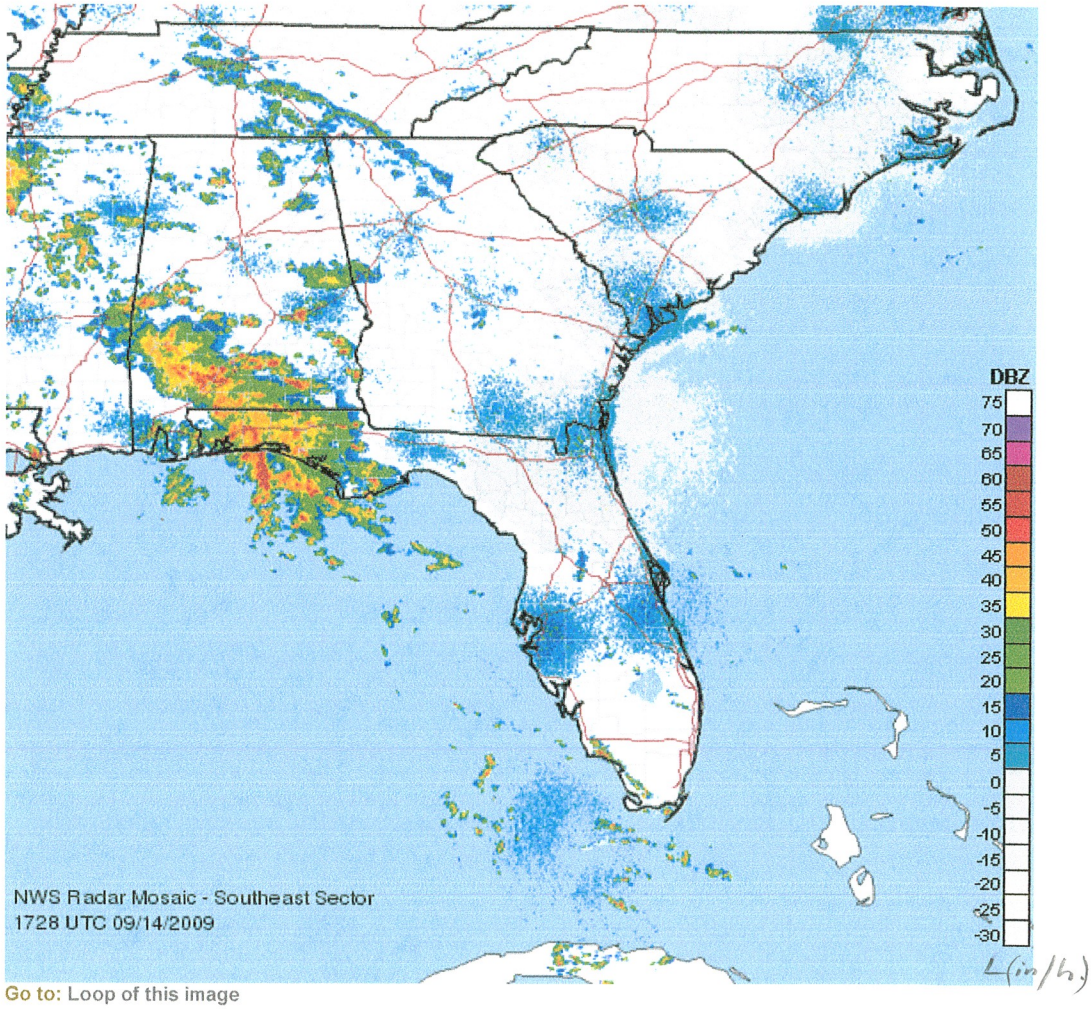
Additional Info:

Radar FAQ
Downloading Images
GIS Users
Doppler University
Color Blindness Tool
Credits

Base Reflectivity

NWS is accepting comments on proposed combined warning and radar displays until October

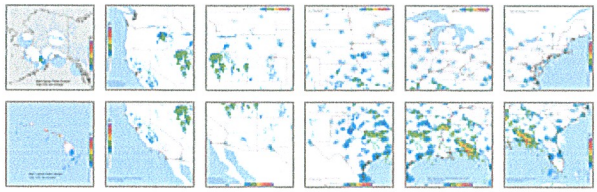
Full resolution version (3400x1700 pixels - 220k)



Go to: Loop of this image

National Radar Mosaic Sectors

(click image)



National Weather Service, NOAA
1325 East-West Highway
Silver Spring, MD 20910
Webmaster's E-mail: SR-SRH.Webmaster@noaa.gov
Page last modified: February 14, 2006

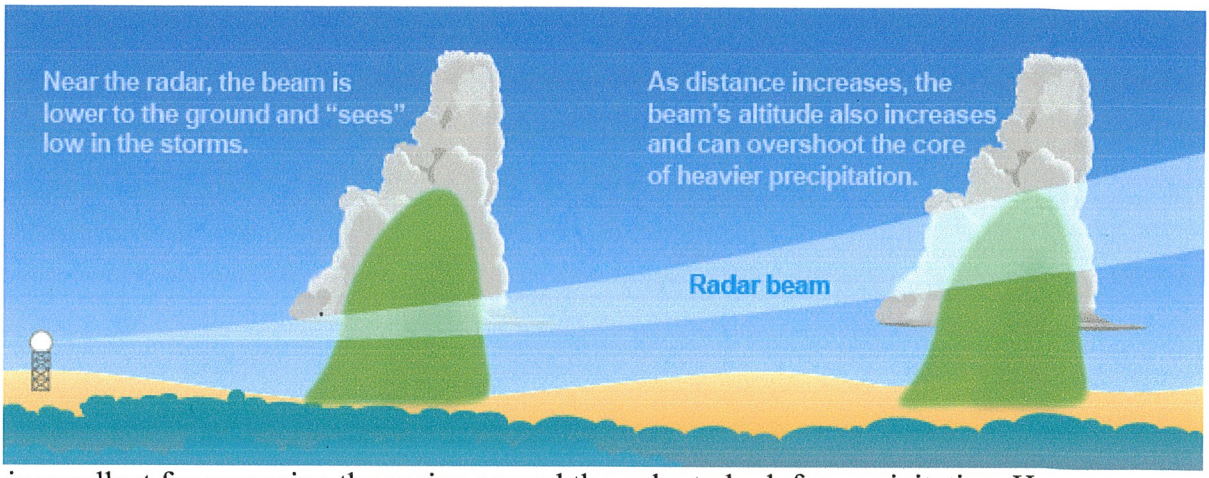
Disclaimer
Credits
Glossary

Privacy Policy
About Us
Career Opportunities

NATIONAL WEATHER SERVICE: *for Safety, for Work, for Fun* - FOR LIFE

Base Reflectivity

Taken from the lowest (½°) elevation scan, base



reflectivity is excellent for surveying the region around the radar to look for precipitation. However, remember the radar beam increases in elevation as distance increases from the radar. This is due, in part, to the elevation angle itself but is more because the earth's surface curves away from the beam.

This can lead to underestimating the strength and intensity of distant storms. For this reason, it is wise to always check the radar images from different locations to help provide the overall picture of the weather in any particular area.

This image (right) is a sample base reflectivity image from the Doppler radar in Frederick, OK. The radar is located in the center of the image. The colors represent the strength of returned energy to the radar expressed in values of decibels (dBZ). The color scale is located at the lower right of each image.

These dBZ values equate to approximate rainfall rates indicated in the table right.

dBZ	Rain Rate (in/hr)
65	16+
60	8.00
55	4.00
52	2.50
47	1.25
41	0.50
36	0.25
30	0.10
20	Trace
< 20	No rain

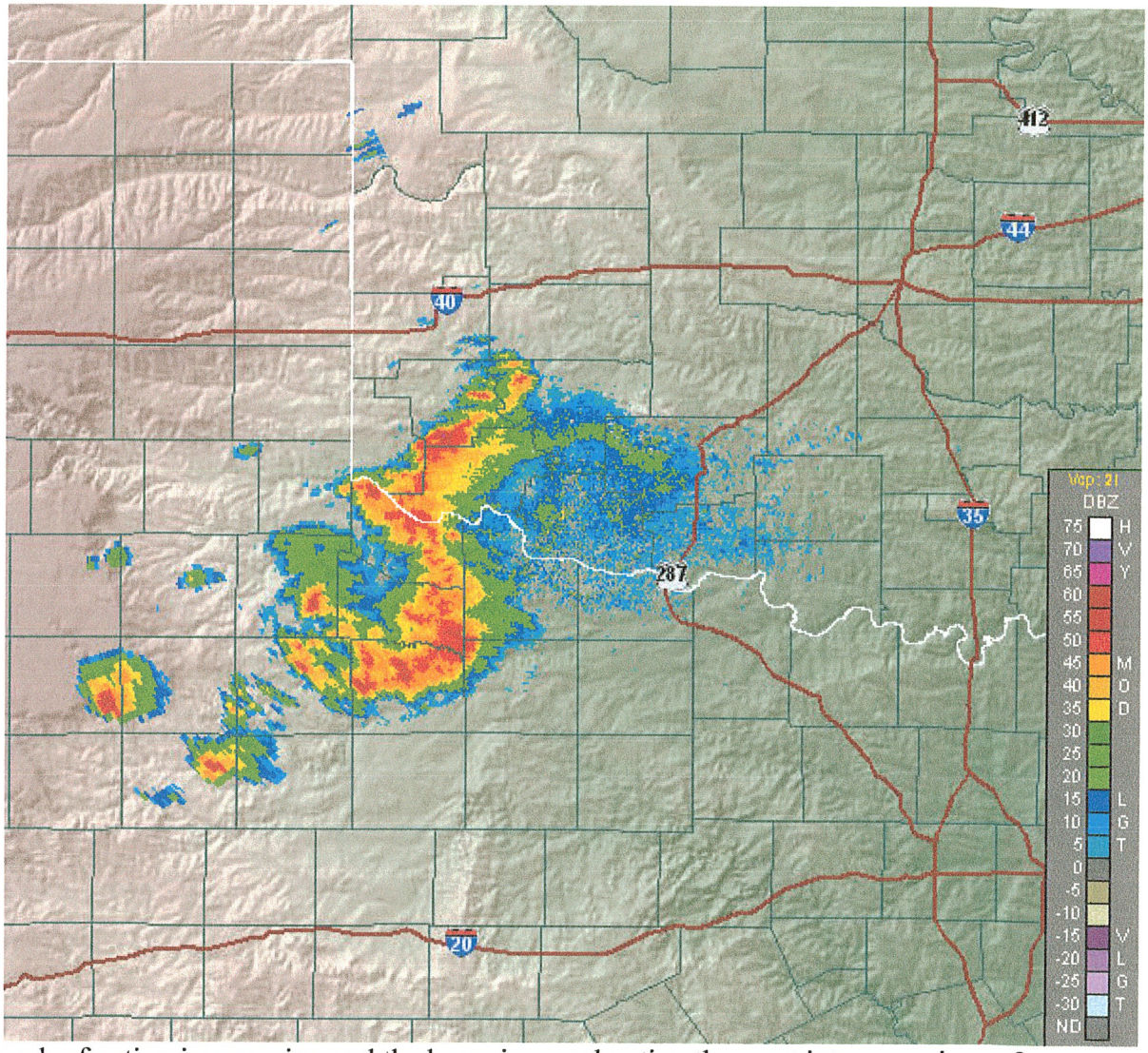
These are hourly rainfall rates only and are not the actual amounts of rain a location receives. The total amount of rain received varies with intensity changes in a storm as well as the storm's motion over the ground.

Also, thunderstorms can contain hail which is often a good reflector of energy. Typically, a hailstone is coated with a thin layer of water as it travels through the thunderstorm cloud. This thin layer of water on the hailstone will cause a storm's reflectivity to be greater, leading to a higher dBZ and an over estimate the amount of rain received.

Value of 20 dBZ is typically the point at which light rain begins. The values of 60 to 65 dBZ is about the level where ¾" hail can occur. However, a value of 60 to 65 dBZ does not mean that **severe weather** is occurring at that location.

Severe weather may be occurring with values less (or greater) than 60 to 65 dBZ due to...

- Hail that is totally frozen (without a thin layer of water in the surface). "Dry hail" is a very poor reflector of energy and can lead to an *underestimate* of a storm's intensity.
- Atmospheric conditions such a ducting. When ducting occurs, the radar beam is refracted into the ground (indicating stronger storms than what are actually occurring). However a worse case is



when subrefraction is occurring and the beam is overshooting the most intense regions of storms (indicating weaker storms than what are actually occurring).

- Doppler radars that get out of calibration. The radar can become "hot" (indicating stronger storms than what are actually occurring) or "cold" (indicating weaker storms than what are actually occurring).

These are just some of the reasons to look at the weather using the adjacent radars.

National Weather Service
Southern Region Headquarters
819 Taylor Street, Room 10A06
Fort Worth, TX 76102
Webmaster's E-mail: SR-SRH.Webmaster@noaa.gov
Page last modified: September 1, 2009