

# THE ATMOSPHERIC RESERVOIR

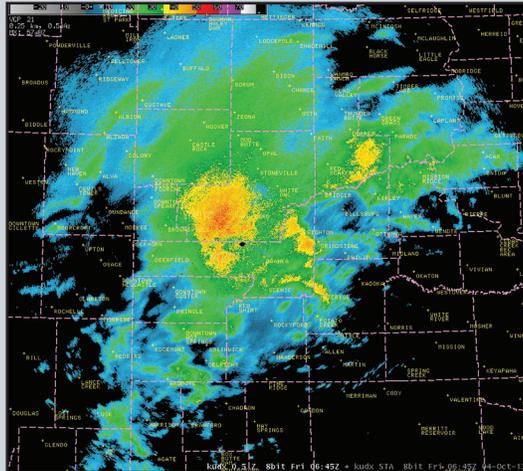
*Examining the Atmosphere and Atmospheric Resource Management*

## "Mixed Precipitation"

By Mark D. Schneider

Given the choice of receiving freezing rain or snow most North Dakotans will tell you that they prefer the latter. The American Meteorological Society (AMS) glossary defines mixed precipitation as "any of the following combinations of freezing and frozen precipitation: snow and sleet, snow and freezing rain, or sleet alone. Rain may also be present." During autumn and spring, conditions in North Dakota are generally more favorable for mixed precipitation to occur because we're in transition between warm and cold air masses. Our atmosphere is dynamic and it's not uncommon to have air temperatures below freezing at the earth's surface with warmer air aloft. This scenario can lead to hazardous driving conditions on icy roads and power outages due to downed utility lines when freezing rain or freezing drizzle accumulate.

Freezing rain and drizzle are typically a result of snow aloft that falls through a deep warm cloud layer, melts and then refreezes when it contacts surfaces that are below freezing. Sleet on the other hand is rain or partially melted snow that freezes into ice pellets before making contact with the ground. Sleet is associated with a much more shallow layer of warm air aloft that only partially melts snow during its descent. Oftentimes you'll see sleet actually bounce and make



Courtesy of the National Weather Service  
Forecast Office Rapid City

a sound when it hits the ground and this helps distinguish it from other types of precipitation.

Meteorologists use the melting layer, or altitude where ice-phase precipitation melts as it descends, to identify areas where mixed precipitation occurs. A radar signature called the bright band helps meteorologists identify the melting layer. Bright banding appears as an area of higher reflectivity in a ring or circular pattern that's usually equal distance from the radar (see image). A previous atmospheric reservoir article explained how the recent dual-polarization upgrades in the National Weather Service radar network have improved the identification of mixed precipitation. In addition, actual surface weather observations are used in conjunction with radar products to provide more accurate advisories and warnings to the public during mixed precipitation events.

Lastly, many people are curious what the differences between rain and drizzle are. The size of a water drop determines its official status as either a rain drop (greater than 0.5mm in diameter) or drizzle drop (arguably 0.2 to 0.5mm). Typically, any drop larger than 0.2mm in diameter is considered rain. The processes that form rain and drizzle are the same, however drizzle typically originates from low stratus clouds and is oftentimes incorrectly referred to as mist.

This is a misnomer because mist is actually suspended water droplets in the air that reduce visibility, not a type of precipitation. Mist can reduce visibilities down to five-eighths of a mile, while visibilities one-half mile or less are known as fog. A phenomenon called freezing fog exists and although this isn't considered precipitation, it freezes on contact and forms a coating of rime or glaze ice creating a hazard.

On days when mixed precipitation is forecast, heed caution and watch for signs of accumulating ice on sidewalks and roadways. Although it may not excite you to see white the next time you look out the window, there's something good about just plain old snow.

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