



# THE ATMOSPHERIC RESERVOIR

Examining the Atmosphere and Atmospheric Resource Management

## "Precipitation by Percentages"

By Mark D. Schneider

Have you ever wondered why it rained more on a day when the National Weather Service (NWS) forecasted a 30 percent chance of rain, than on one with a 90 percent chance?

To understand these percentages, let's first look at the NWS definition for *Probability of Precipitation*: The chance or likelihood of an event occurring at some point in the forecast area, over a certain period of time. When NWS forecasters multiply the probability that precipitation will occur somewhere in the forecast area by the percent of area that will receive measurable precipitation (one one-hundredth of an inch or greater), the result is the percentage used in their forecast products for the public. For example, on a particular day a forecaster thinks that there will be a 60 percent chance that it will rain and that about 70 percent of the forecast area will receive at least one one-hundredth of an inch of precipitation. Multiplied out,  $0.60 \times 0.70$  is equal to 0.42, which would be rounded to 0.40 or 40 percent. The overall chance of precipitation would be 40 percent.

Because North Dakota has 53 counties and Walsh County is split into east and west areas, there are 54 "zones" that the Bismarck and Grand Forks NWS offices use in their forecast products. Within each zone there are now 2.5 kilometer grids that are used for site-specific forecasts and for



(Source NWS Grand Forks) Image shows green box representing a gridded forecast area.

automatic forecast verification. Rain and snow measurements collected by rain gauges and radar-estimated precipitation amounts are compared to each 2.5 kilometer grid box to determine the accuracy of forecasts. Gone are the days when a forecaster could make a general forecast for a large area of the state.

According to John Paul Martin, the Warning Coordination Meteorologist for the NWS Forecast Office (WFO) Bismarck, "We used to paint with a very broad brush when it came to forecasting precipitation and now, with the help of improved technology and data sources, we're able to resolve finer details." In fact, the image used in this article illustrates a specific forecast grid located northwest of Fargo that may have a completely different probability of precipitation

on a given day than the City of Fargo. Martin added that, "This site-specific forecast information can be found on our NWS websites at [weather.gov/bis](http://weather.gov/bis) or [weather.gov/fgf](http://weather.gov/fgf)."

NWS forecasters must also predict specific quantities of precipitation, but this isn't included in the percentage chance of precipitation. Instead, forecasters use comments in their text forecasts such as "new precipitation amounts between a tenth and quarter of an inch possible" to clarify the actual amount that the public can expect.

So on a day when there's a 30 percent chance of thunderstorms forecasted, you might very well receive a half inch of rainfall while only getting one one-hundredth of an inch of rain on a day when there's a 90 percent chance. The story of a former NWS Williston employee who was fondly nicknamed "Two Percent" may further clarify this point. When asked what the chance of rain was for a particular day, this gentleman simply replied, "Two percent." A downpour of rain resulted and when someone checked back with the NWS office for an explanation as to why a deluge occurred, "Two Percent" simply replied, "Good thing you didn't receive the other 98 percent!"

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