

Calibrated Probabilistic Guidance Parameters

Calibrated Probabilistic Guidance parameters are created for tornadoes, severe hail, and severe wind hazards. 4-hour and 24-hour forecasts are generated for each severe hazard.

How are the Calibrated Probabilistic Guidance parameters computed?

Calibrated Probabilistic Guidance parameters utilize the SSEO and SREF ensembles. The neighborhood probabilities of atmospheric variables used to generate each severe hazard are:

Hazard	SSEO Variable	SREF Variable
Tornado	$UH \geq 25 \text{ m}^2/\text{s}^2$	$STP \geq 1$
Hail	$UH \geq 25 \text{ m}^2/\text{s}^2$	$MUCAPE \geq 1000 \text{ J/kg} \times \text{Eff. Shear} \geq 20 \text{ kt}$
Wind	$UH \geq 25 \text{ m}^2/\text{s}^2$	$MUCAPE \geq 250 \text{ J/kg} \times \text{Eff. Shear} \geq 20 \text{ kt}$

For the 4-hour forecasts, at every valid forecast hour the maximum of each variable over the previous 4 hours are paired at each grid point. The historical frequency of a hazard (i.e., tornado, hail, or wind) report occurring within 25 miles of that grid point and within the 4-h period for that forecast pair of probabilities is substituted as the 4-h calibrated hazard probability.

For the 24-hour forecasts, the output probabilities of the 4-hour forecasts are utilized. Every other valid hour of the 4-hour forecasts are employed. At every grid point, the cumulative sum of the 4-hour probabilities and the maximum 4-hour probability are paired. The historical frequency of a report occurring within 25 miles of that grid point and within the 24-h period for those 4-h calibrated hazard probabilities is substituted as the 24-h calibrated hazard probability.

For more information about the calibration table methodology, please see <http://www.spc.noaa.gov/publications/jirak/calprob.pdf>.

How often are the 4-hour forecasts run?

Generated for 0300, 0900, and 1500 UTC using the 0000 UTC SSEO and 0300 UTC SREF, 0000 UTC SSEO and 0900 UTC SREF, and 1200 UTC SSEO and 1500 UTC SREF, respectively. Forecasts are valid every 2 hours over the previous 4 hours and end at 1200 UTC the next day.

How often are the 24-hour forecasts run?

Generated for 0300, 0900, and 1500 UTC using the 0000 UTC SSEO and 0300 UTC SREF, the 0000 UTC SSEO and 0900 UTC SREF, and the 1200 UTC SSEO and 1500 UTC SREF, respectively. Forecasts have only one time period and are valid from 1200 UTC the current day until 1200 UTC the next day.

Are there any limitations with these parameters?

The Calibrated Probabilistic Guidance parameters are primarily a statistical approach to severe weather forecasting. Physical reasoning was used to determine which atmospheric variables would be most applicable to each hazard. However, the computation of the calibration tables is purely statistic. We are measuring the probabilities of two variables exceeding thresholds and matching with an observed storm report at the same grid point. The amount of available storm report data obviously has a significant influence on the successfulness of the parameters. We hope that as we acquire more storm report data through time that our calibration tables become well-tuned.

We are also testing other atmospheric variables in place of the current ones to determine if better performance in the calibrated forecasts occurs.

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