

**Improving Lightning and Dry Lightning Guidance with Calibrated Probabilities from Regional and Convection Allowing Ensemble Model Output**

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Lightning-ignited wildfires are responsible for the majority of acreage burned across the United States. Thunderstorm guidance, especially for dry thunderstorms, is an essential component for fire weather forecasts, which are used by wildland fire managers when making decisions about resource allocation and suppression tactics. The Storm Prediction Center (SPC) Short Range Ensemble Forecast (SREF) based calibrated probabilistic thunder forecast guidance is being refined to improve lightning prediction guidance. The guidance provides forecast probabilities of cloud-to-ground (CG) lightning that exceed 1 or more and 25 or more CG lightning flashes for 1-, 3-, 4-, 8-, 12-, and 24-hour periods (out to an 87-hour forecast) in a 40-km grid box. These refinements include examining variables available in convection allowing models (i.e., simulated reflectivity at -10 °C) that would supplement the SPC SREF based calibrated thunder approach. Additionally, SPC is testing new dry thunderstorm probabilistic guidance that uses the joint 3-hour probability of SREF calibrated thunder, precipitation less than 0.10", precipitable water less than 1", and surface relative humidity less than 30%. A potential additional outcome from this research is a new "lightning activity level" (LAL) that would better communicate the probability, coverage, and amount of lightning and rain expected.