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Evaluation of the Lightning Potential Index Developed by NWS Grand Junction, Colorado

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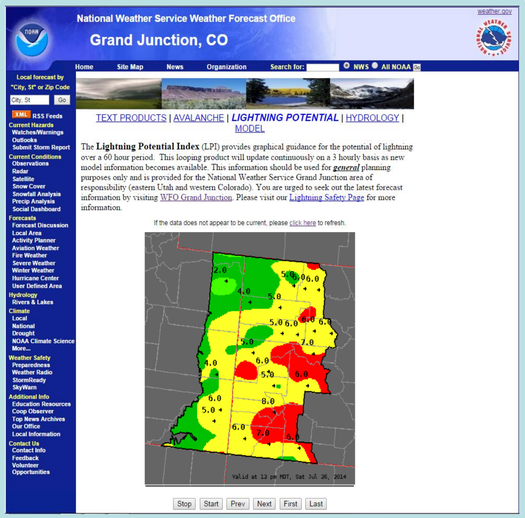


WFO Grand Junction website display of LPI

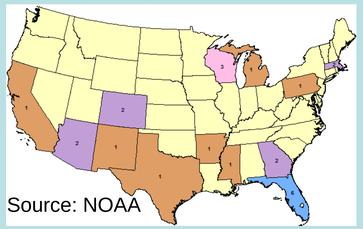
What is the Lightning Potential Index (LPI)?

- The lightning methodology described in the accompanying poster presentation describes in detail the parameters used including:
  - Precipitation Potential Placement (PPP)
    - A combination of precipitable water and humidity
  - Elevated Moisture Transport magnitude and humidity
    - Used to capture representation of the ice crystal growth regime
- The magnitude of these moisture parameters are combined with CAPE and other severe parameters
- This methodology is then scaled into the Lightning Potential Index (LPI) as shown in this poster

Objectives:

- Describe the Lightning Potential Index.
- Raise Public Awareness
- Demonstrate the utility of the LPI as a useful lightning predictor.
- Future goals.

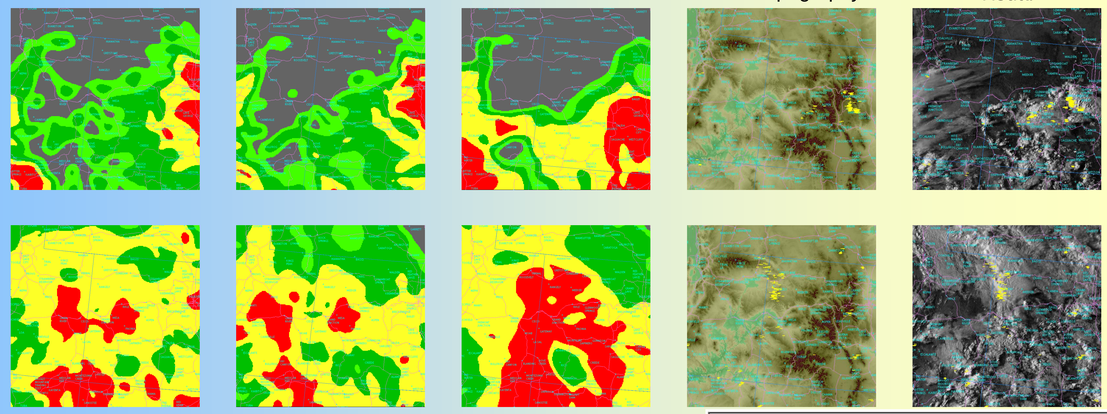
Lightning Fatalities for 2014 by State



Source: NOAA

Forecast

Observed



Here is an example of a two day event demonstrating the utility of the LPI

The LPI forecasts are shown in the left three columns valid at the date/time on the left

One-hour lightning is shown in column 4 (over terrain), and combined with satellite in column 5

The LPI in these examples tends to have a good handle on the temporal and spatial scale

LPI tended to “over-predict” the intensity of the observed lightning

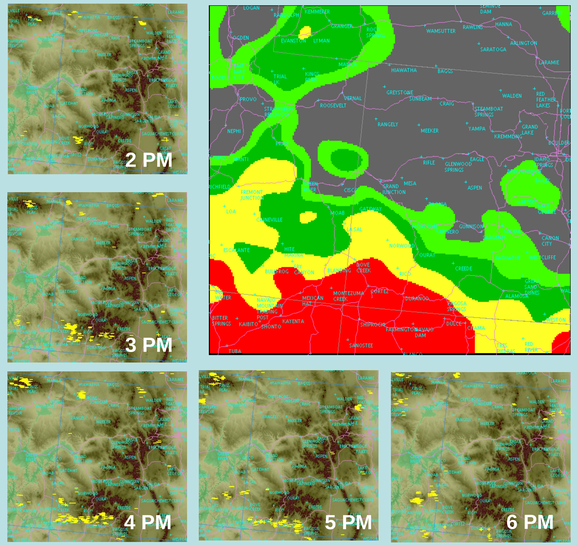
Limitations on Available Data Sets in GFE (e.g., most Unstable CAPE 1-6 km AGL and objective observations is a better CAPE parameter).

Some of the implied over-prediction by the LPI may be an artifact of the fact that the forecasts are a 3-hour smoothed LPI while the lightning observations are one-hour totals.

Color Key and Explanation	
Low Risk	Low Risk: The lightning threat may either be negligible or low. Isolated thunderstorms may occur, but the probability of thunderstorms is low.
Moderate Risk	The lightning threat is considered moderate. Isolated thunderstorms are expected within the green area.
High Risk	The lightning threat is considered high. Expect scattered thunderstorms within the yellow area. Plan accordingly, as there is a high probability of lightning in the yellow area. Be aware of lightning safety guidelines.
Extreme Risk	Lightning in the red area will occur. Practice lightning safety, as the threat of lightning is imminent.

Case Event – 17 September 2014

Evolution of Thunderstorms over the Four Corners



Here is an application of the LPI indicating an extreme risk of lightning (3PM-6PM) as indicated by the red area

Convection fired over this region as a result of gust front convergence in a convectively-favored environment

Future Goals

- Develop a robust verification scheme to quantify the utility of the LPI
- Does the scale that defines Low, Moderate, High, Extreme need adjustment?
- Examine if a blended model approach provides a better forecast?
- Demonstrate the usefulness of the LPI over other areas
- Suggestions on Lightning Verification?

Photo Credit: Maestoso Photography