

LAMP – Ceiling and Visibility Forecasts

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Localized Aviation MOS Program (LAMP) Background

- LAMP is a system of objective analyses, simple models, regression equations, and related thresholds which together provide guidance for sensible weather forecasts
- LAMP acts as an update to GFS MOS guidance
- Guidance is both probabilistic and non-probabilistic
- LAMP provides guidance for aviation elements
- LAMP bridges the gap between the observations and the MOS forecast

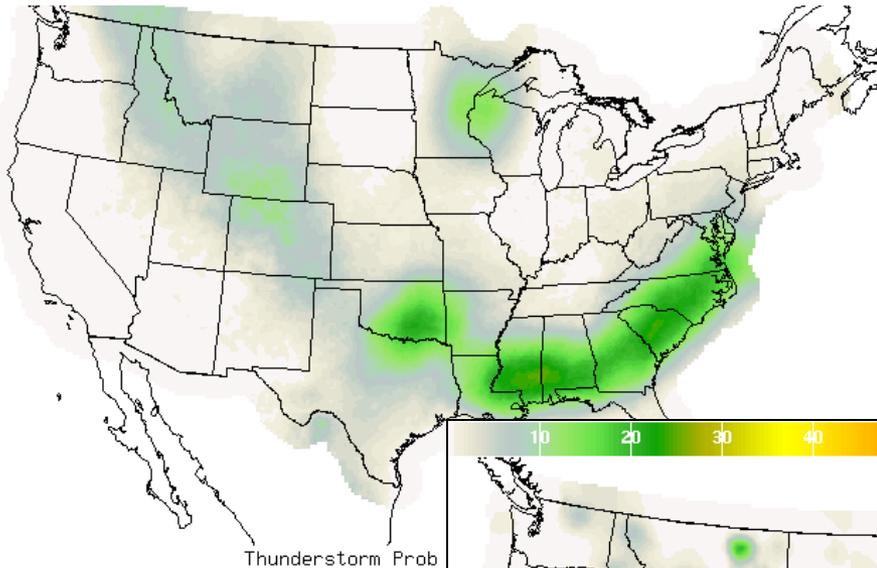
Current Status: LAMP Guidance Details

LAMP guidance is in the range of 1- 25 hours in 1 hour projections

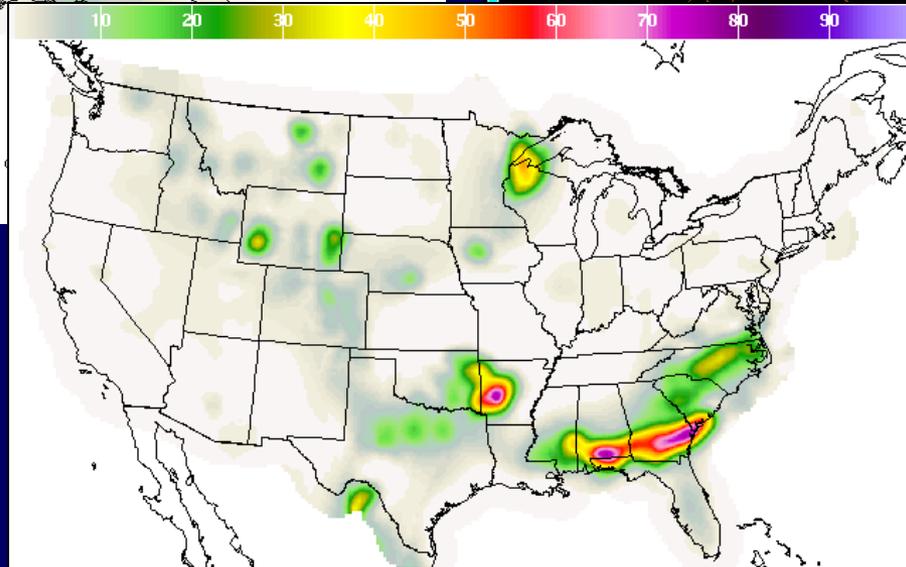
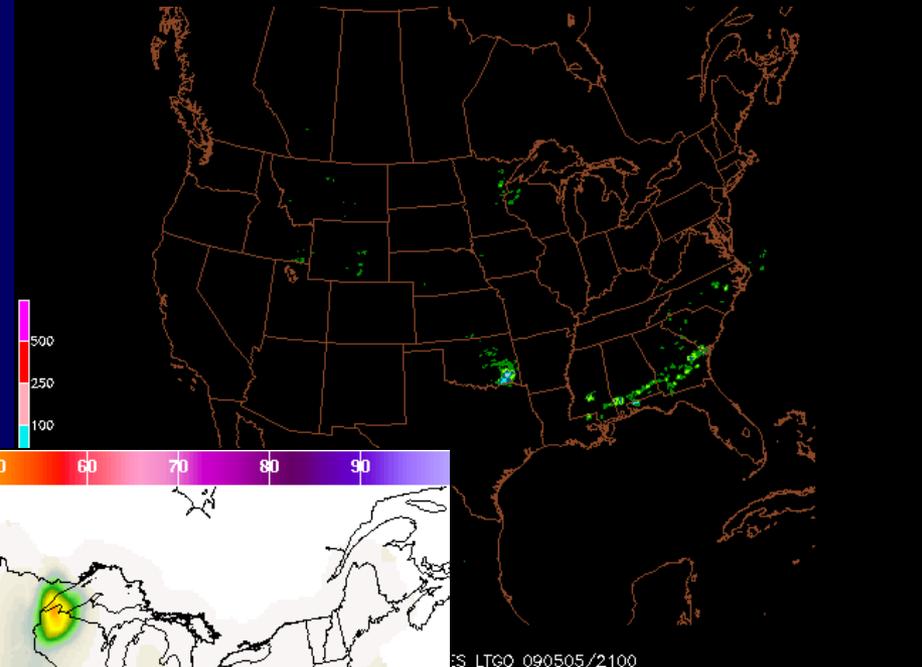
- LAMP provides station-oriented guidance for:
 - all LAMP forecast elements
 - ~1600 stations
 - CONUS, Alaska, Hawaii, Puerto Rico
 - LAMP provides grid-oriented guidance for:
 - Thunderstorms:
 - Probability of thunderstorm occurrence in a 2 hour period in a 20-km grid box
 - Best Category Yes/No of thunderstorm occurrence in a 2 hour period in a 20-km grid box
 - CONUS only
 - Runs 24 times a day (every hour) in NWS operations
- Temperature and dewpoint
 - Wind speed, direction, and gusts
 - Probability of precipitation (on hr)
 - Probability of measurable precipitation (6- and 12-h)
 - Precipitation type
 - Precipitation characteristics
 - Thunderstorms
 - Ceiling height
 - Conditional ceiling height
 - Total sky cover
 - Visibility
 - Conditional visibility
 - Obstruction to vision

1-3 hr LAMP Thunderstorm forecast

Predictor: 12 UTC MOS Thunderstorm
Prob Valid 22 – 00 UTC



Predictor: 21 UTC lightning strike data



21 UTC LAMP Thunderstorm
Probability Valid 22-00 UTC

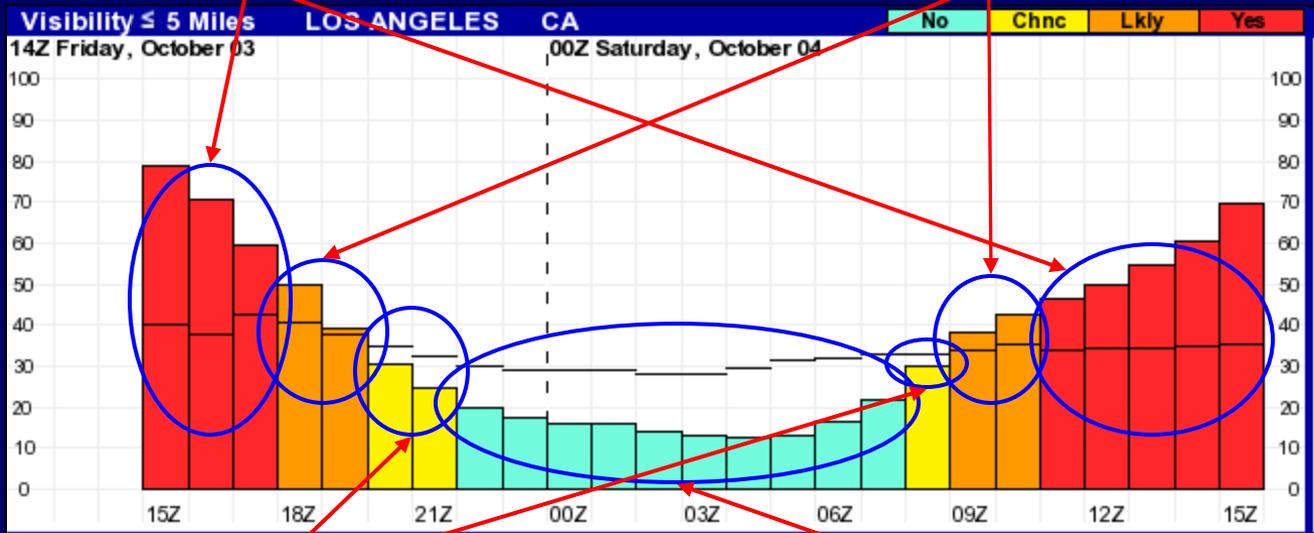


LAMP Probabilities and Thresholds for Flight Categories

Uncertainty Plot Tab – looking at vis ≤ 5 miles

Red=Yes
Probability exceeds threshold by more than 10%

Orange=Likely
Probability exceeds threshold but NOT by more than 10%



Yellow = Chance
Probability is less than t
wi

Cyan = No
Probability is less

Note that this shows you one condition (e.g., vis ≤ 5 miles). To determine the most likely condition, you should consider rarer conditions first.

Gridded LAMP Work

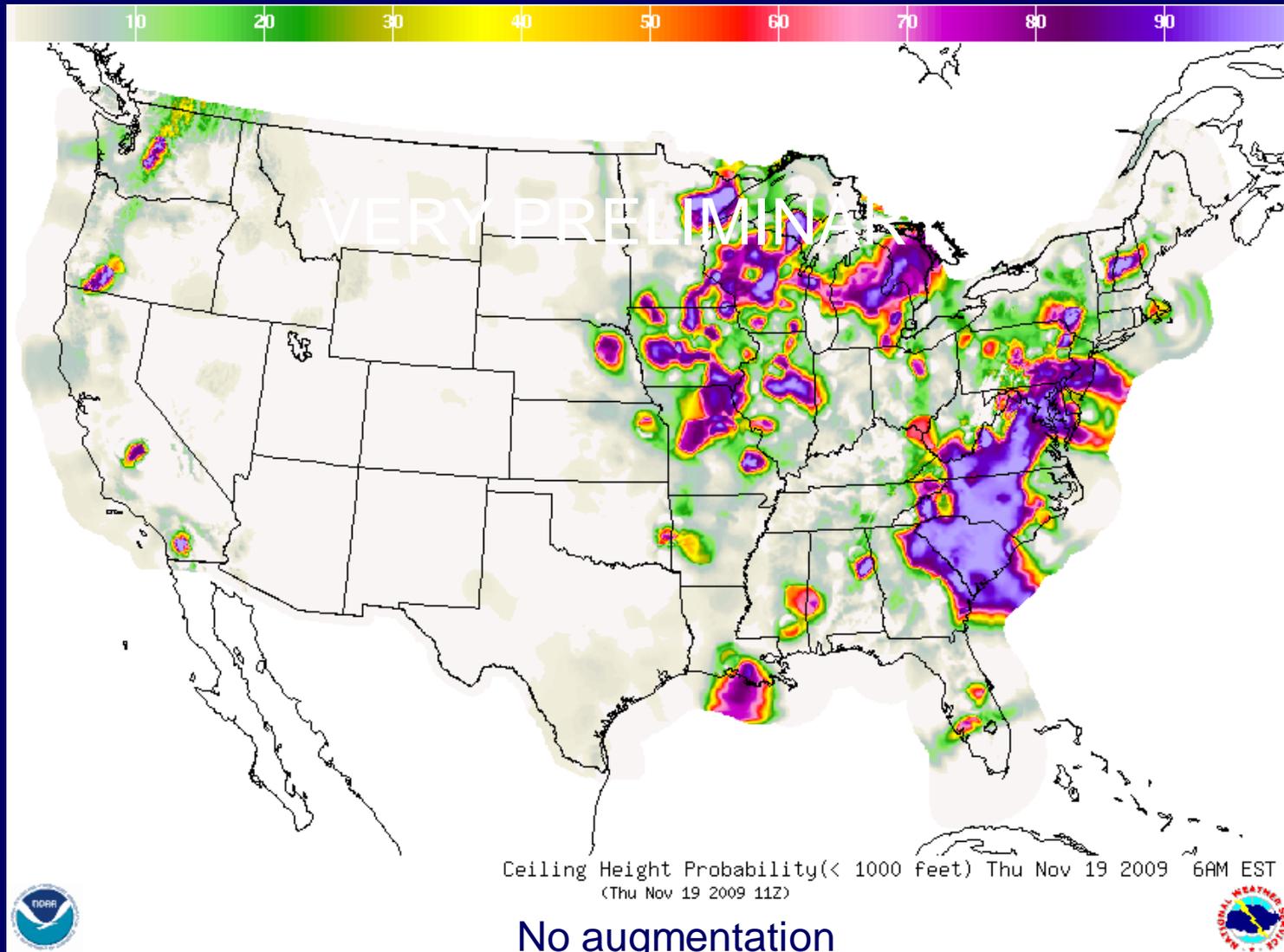
- Gridded LAMP analyses (0-hr analysis of observations)
 - Temperature and Dewpoint
 - Winds
 - Ceiling Height (100's of ft)
 - Visibility (miles)
- Gridded LAMP forecasts of:
 - Temperature and Dewpoint
 - Winds
 - Probabilities of Ceiling Height
 - Ceiling Height (100's of ft)
 - Probabilities of Visibility
 - Visibility (miles)
- Other elements later

Now, what to do for ceiling height and visibility?

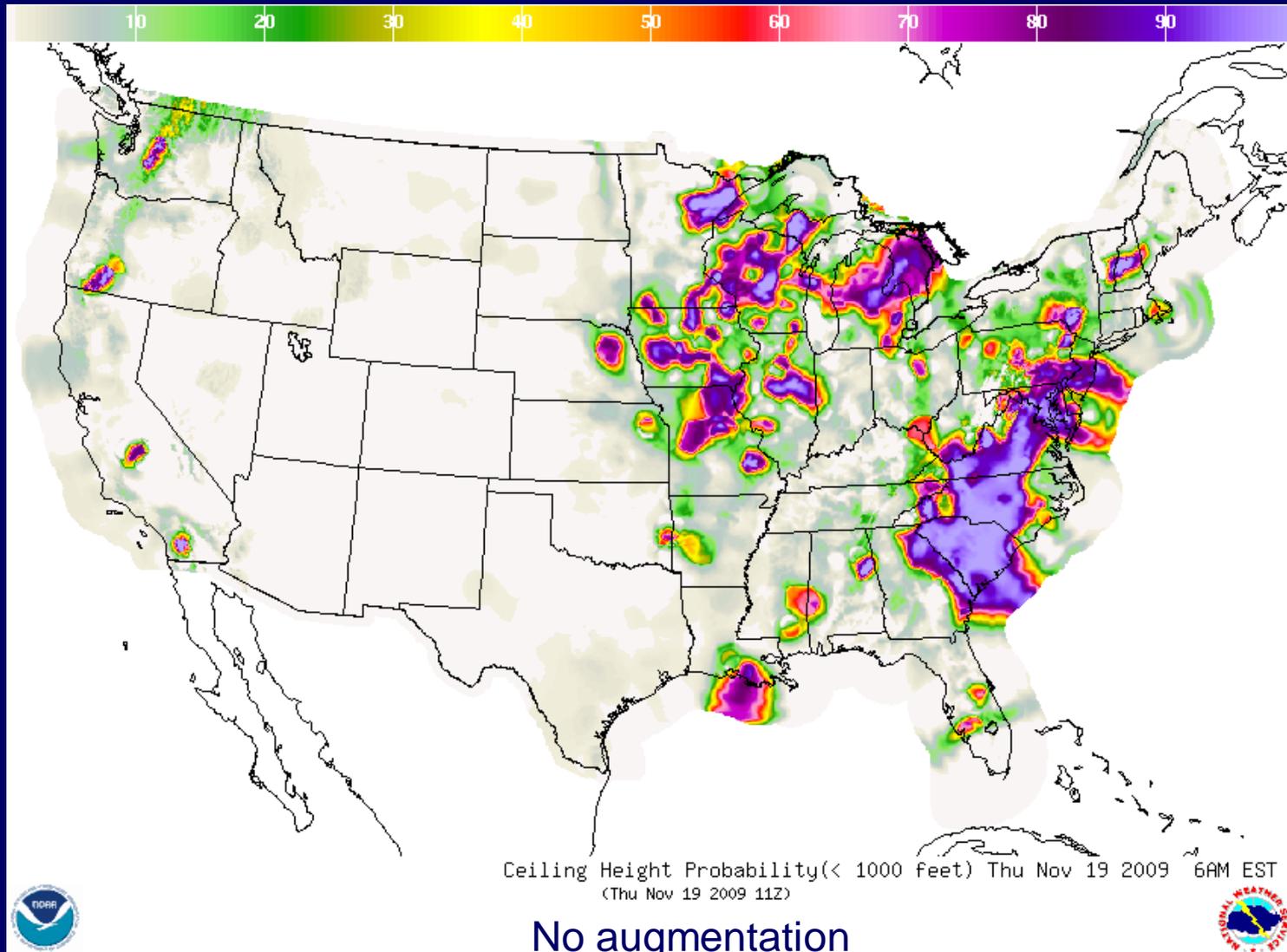


- Ceiling/Vis more discontinuous than temperature and dewpoint
- Ceiling/Vis observations available for METAR stations but not Mesonet stations
- → Far less observations for ceiling height/visibility compared to temperature & dewpoint
- → Poorer analysis of observations

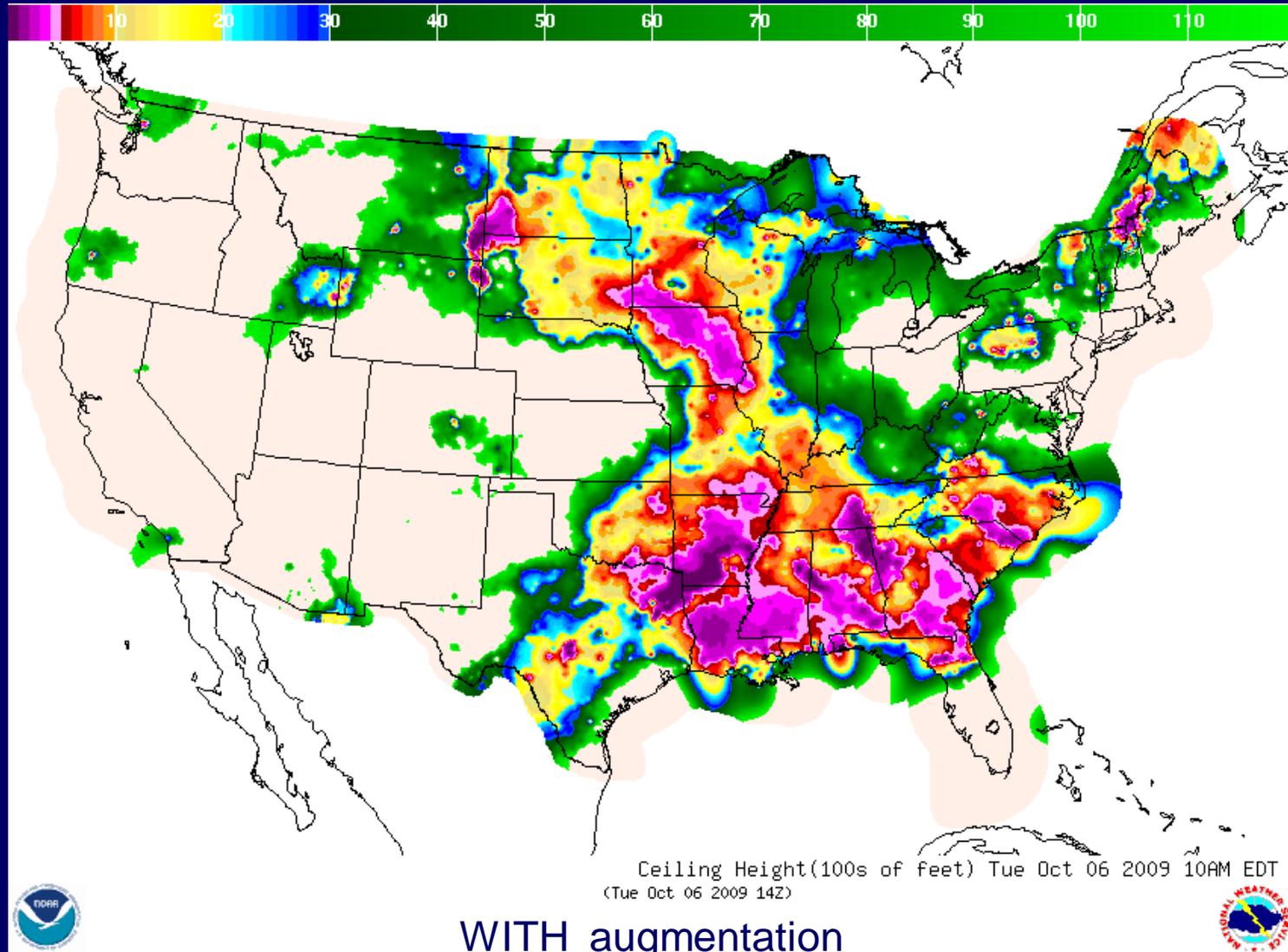
Ceiling Height Probability GLMP example: 1000 UTC, 1-hr forecast



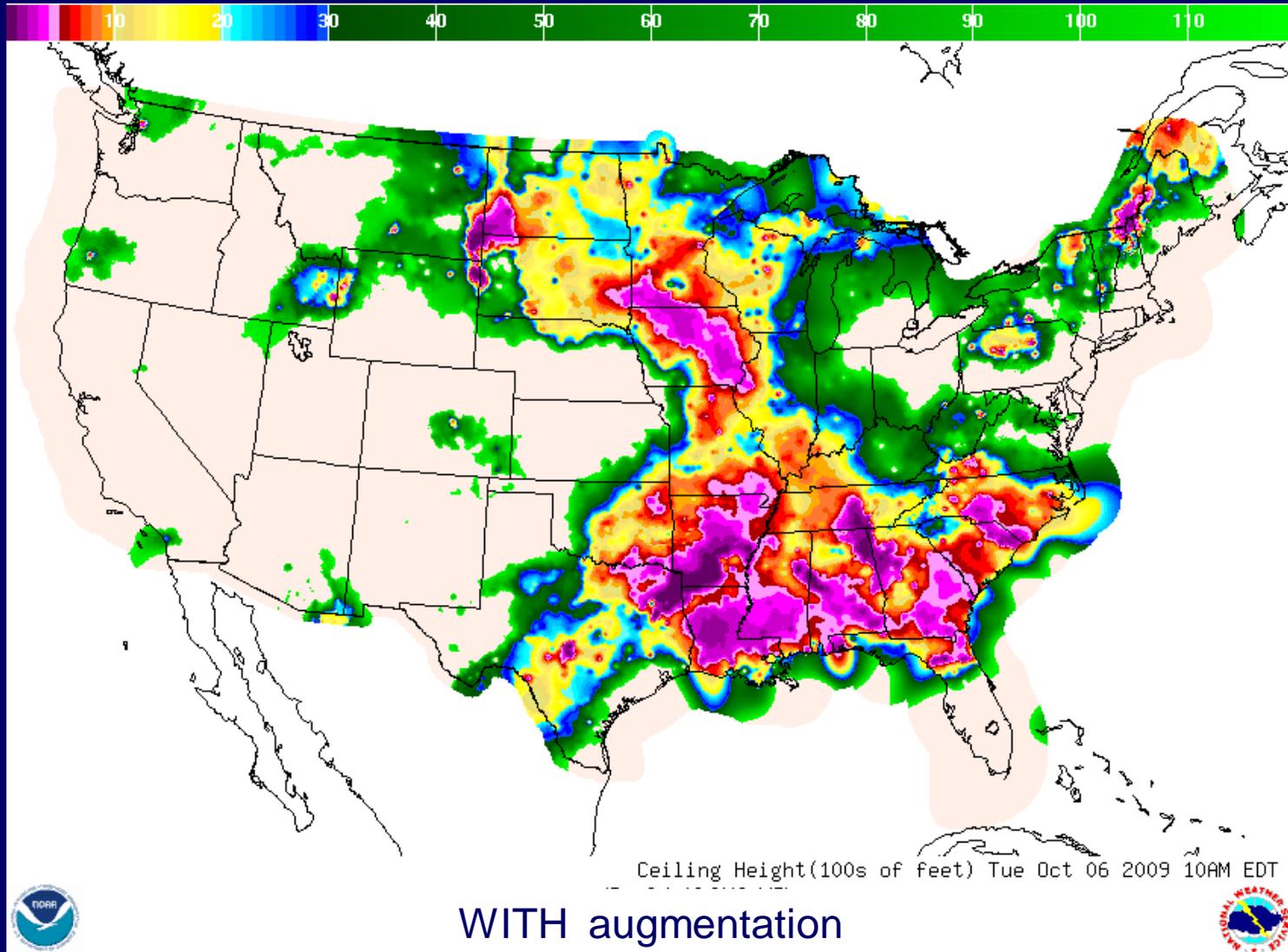
Ceiling Height Probability GLMP example: 1000 UTC, 1-25 hour forecast



Ceiling Height (100's of ft) GLMP example: 1300 UTC, 1-hr forecast



Ceiling Height (100's of ft) GLMP example: 1300 UTC, 1-25 hour forecast



Unique benefits of LAMP

- LAMP provides hourly updates to the Global Forecast System (GFS) MOS forecasts from 1 - 25 hours over the contiguous United States (CONUS), Alaska, Hawaii, and Puerto Rico (OCONUS).
- LAMP weather forecast guidance is adjusted in response to rapidly changing conditions in the observation, especially in the short-term (1-6 hour projection range).
- LAMP produces reliable probabilistic and accurate categorical forecasts for weather elements that significantly impact aviation travel (e.g., ceiling height, visibility, and thunderstorms).
- Unlike many other forecast products, LAMP produces reliable probabilistic and accurate categorical forecasts for the unique aviation weather elements of conditional ceiling height and conditional visibility.

Limitations of LAMP

- Poor quality observations can significantly affect the quality of LAMP forecasts, especially in the short-term.
- In general, LAMP does not use dynamical models in its objective forecasting scheme. Instead, the GFS MOS is substituted. Presumably, all GFS dynamical model information will be contained in the GFS MOS. One major drawback to this approach is in situations where the GFS dynamical model is performing poorly.
- Even in situations where it is clear that the GFS MOS forecasts are incorrect, LAMP generally converges to these GFS MOS forecasts. LAMP has no self-correction method for this scenario.
- Forecasts are only issued for METAR stations, except gridded thunderstorm forecasts are issued on a 20-km grid.