



WCROSS Science Quarterly Briefing



Localized Aviation Model Output Statistics (MOS) Product (LAMP): Upgrades LAMP/GLMP v2.0.0

November 02, 2016



Development Details



Convection and Lightning LAMP guidance:

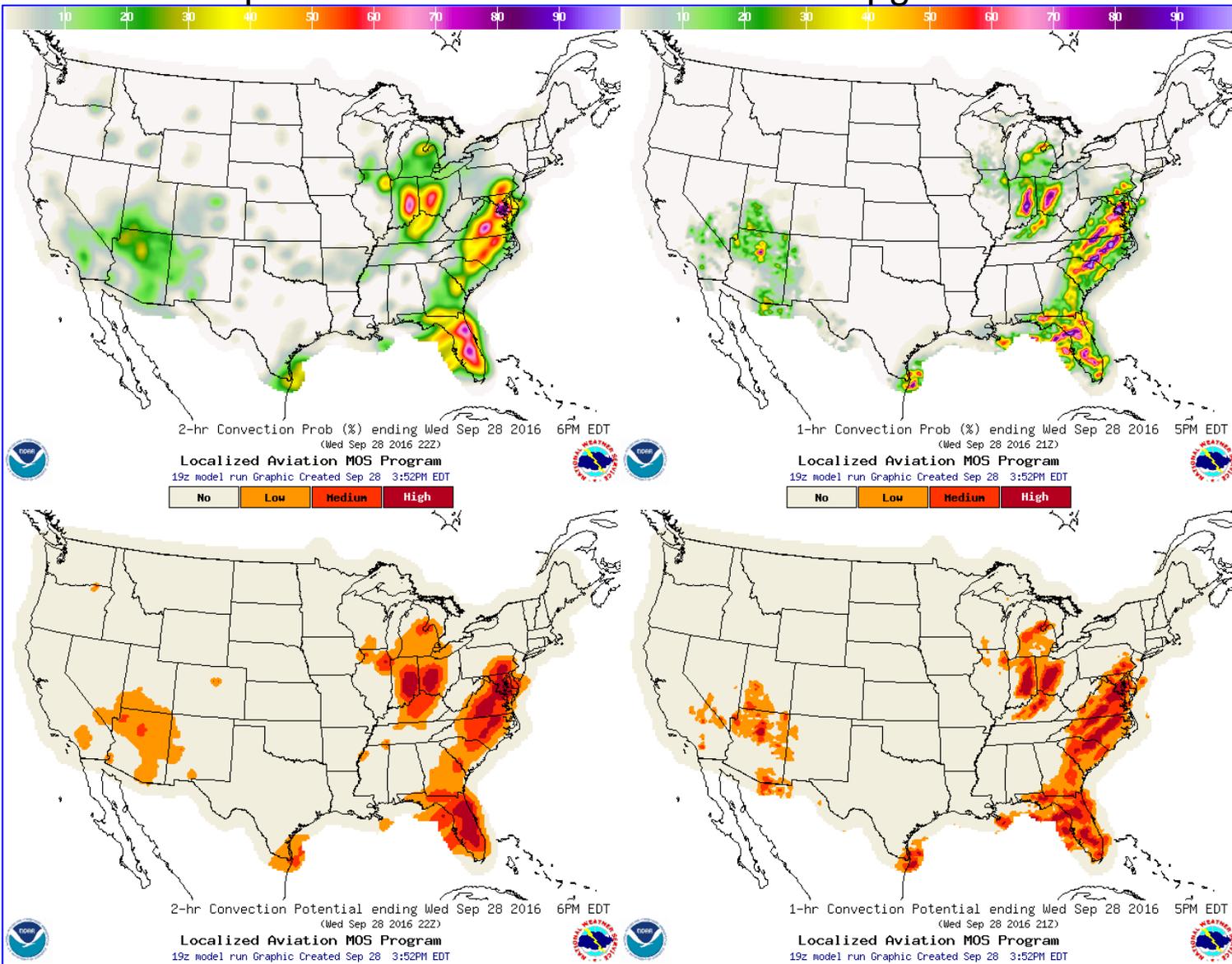
- Improvements due to utilizing HRRR, MRMS, and TL
- Guidance: Probabilities and Potentials (None/Low/Medium/High)
- Development Period: January 2012 - May 2016
- Verification Period: 246 days withheld in above period for 3 different seasons
- Convection and Lightning prototypes now running hourly:
http://www.weather.gov/mdl/lamp_experimental
- Regression development:
 - Inputs HRRR, MRMS, TL, GFS MOS, NAM MOS, climatology
 - Equations developed at grid points and evaluated at grid points
 - Interpolated from grids to stations for bulletin/BUFR
- Results in better temporal (1-hr projections) and spatial resolution of convection and lightning guidance



Convection: 9/28 1-2 hr forecast, valid 22z

Operational

Upgraded

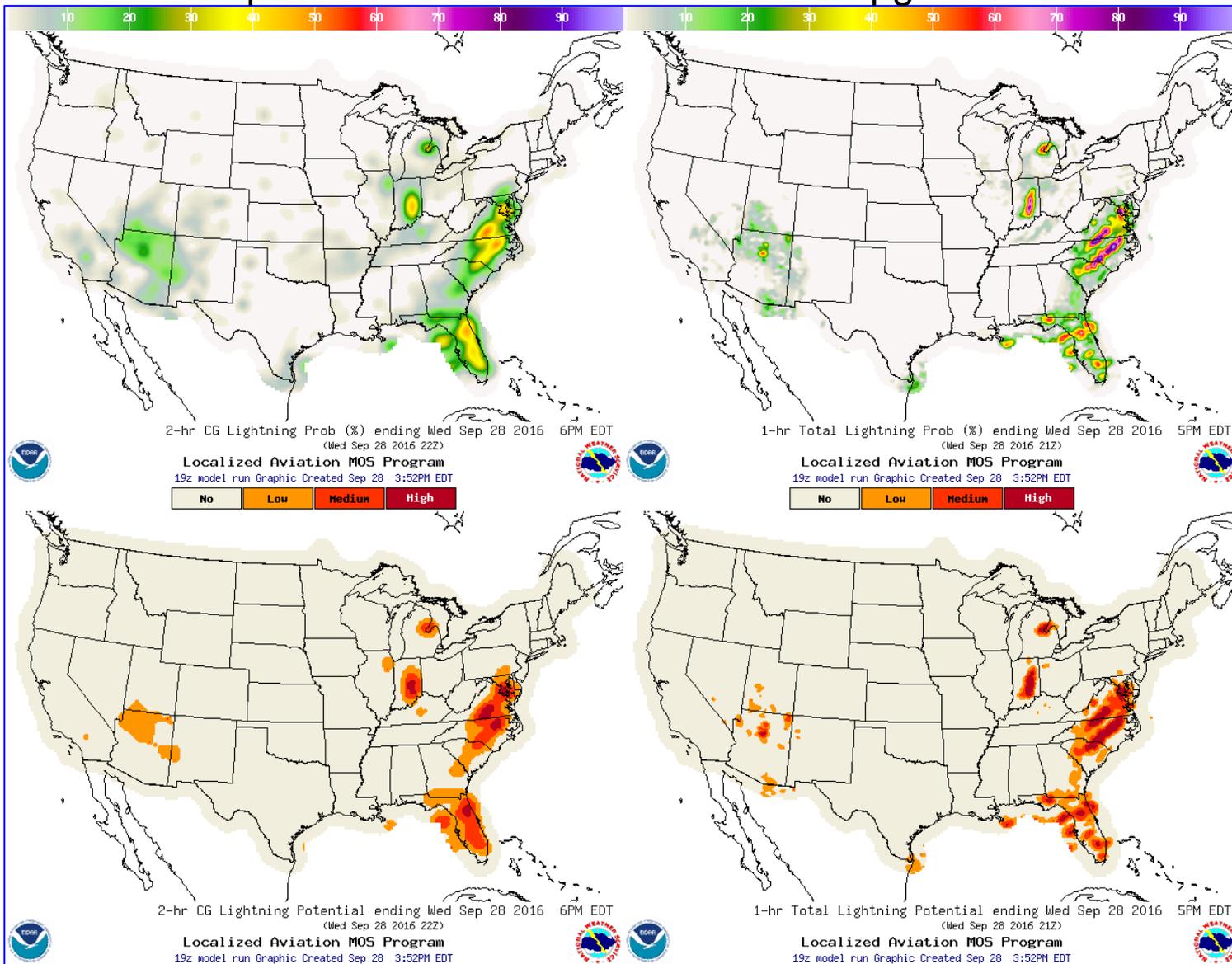




Lightning: 9/28 1-2 hr forecast, valid 22z

Operational

Upgraded

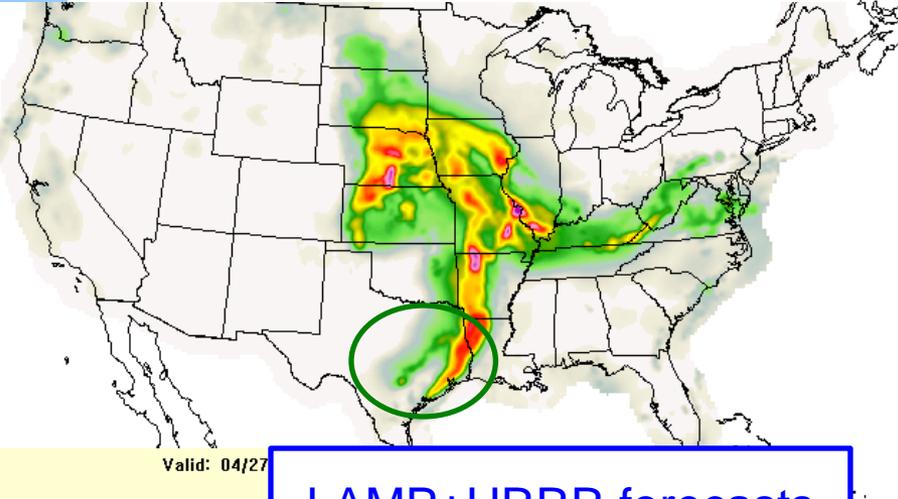
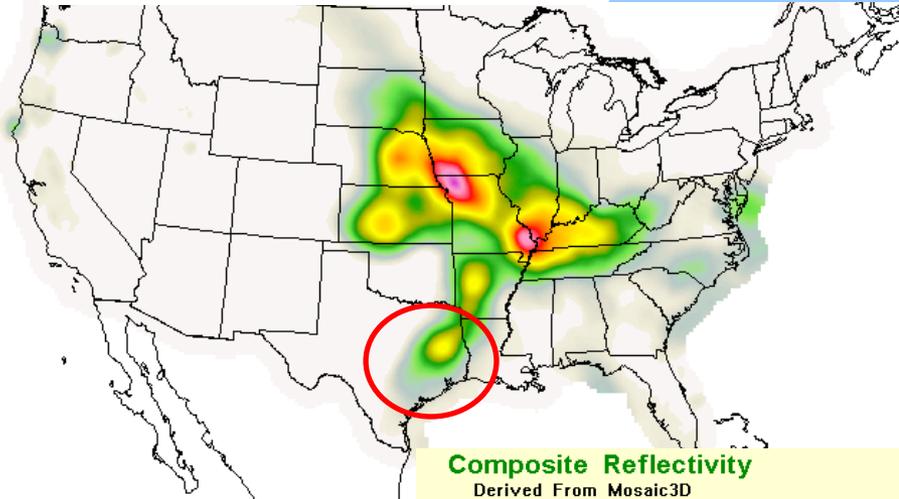




2-h Operational

14-h Forecast

1-h Upgraded



Composite Reflectivity
Derived From Mosaic3D

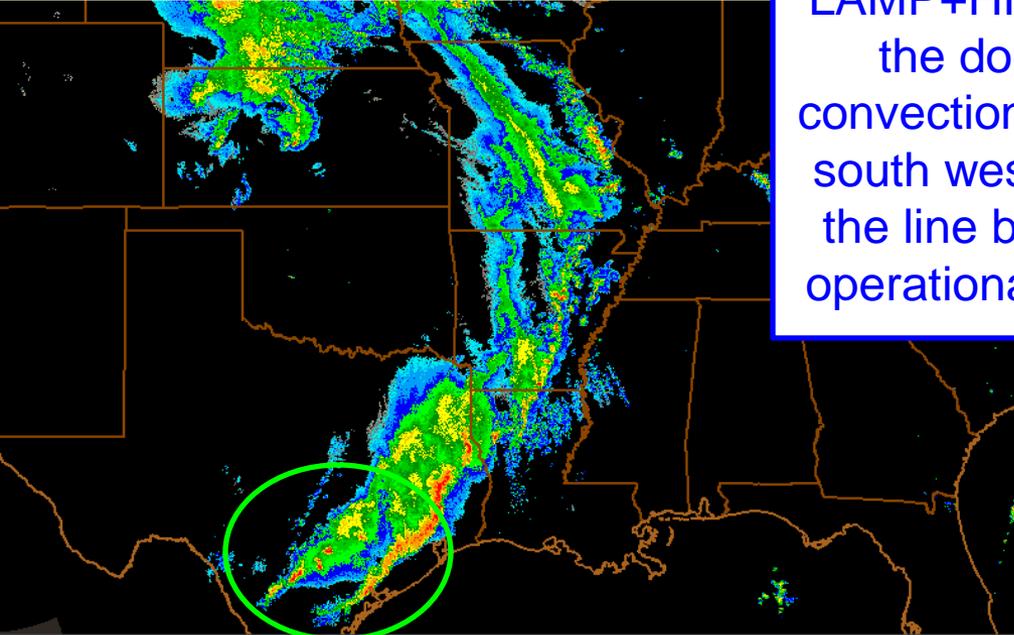
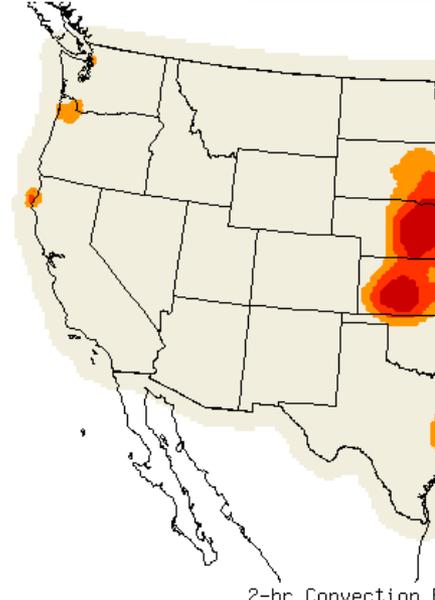
Valid: 04/27

LAMP+HRRR forecasts the double line of convection in TX and the south western extent of the line better than the operational LAMP does.

2-hr Convection

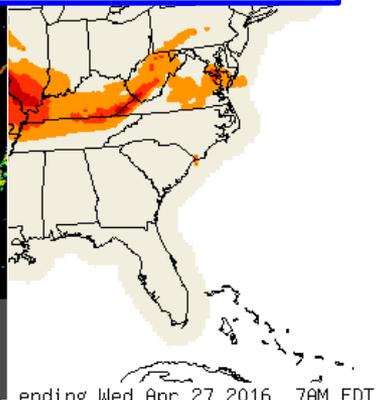
Localized Aviation MOS Program
21z model run Graphic

No Low



2-hr Convection

Localized Aviation MOS Program
21z model run Graphic Created Apr 26 5:36PM EDT



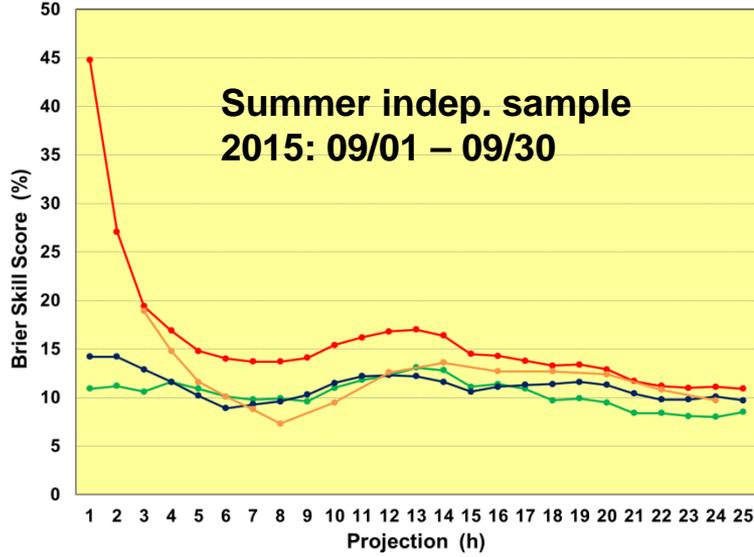
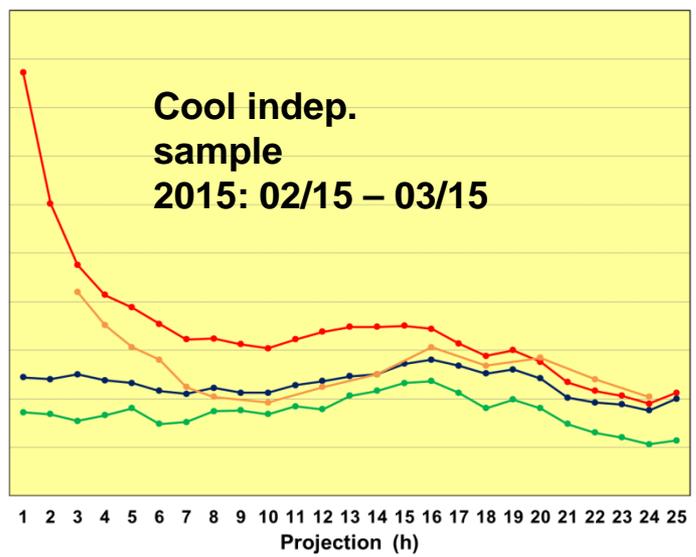
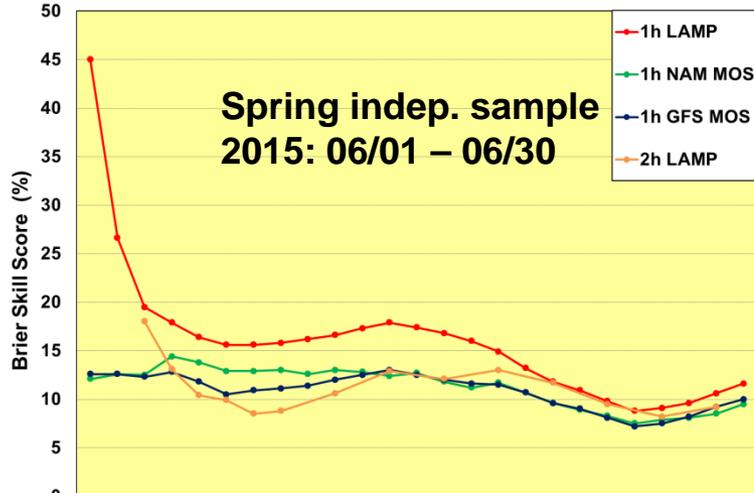
Localized Aviation MOS Program
21z model run Graphic Created Apr 26 5:36PM EDT





Skill of LAMP Versus other Convection Probabilities

18z LAMP cycle



Legend description:

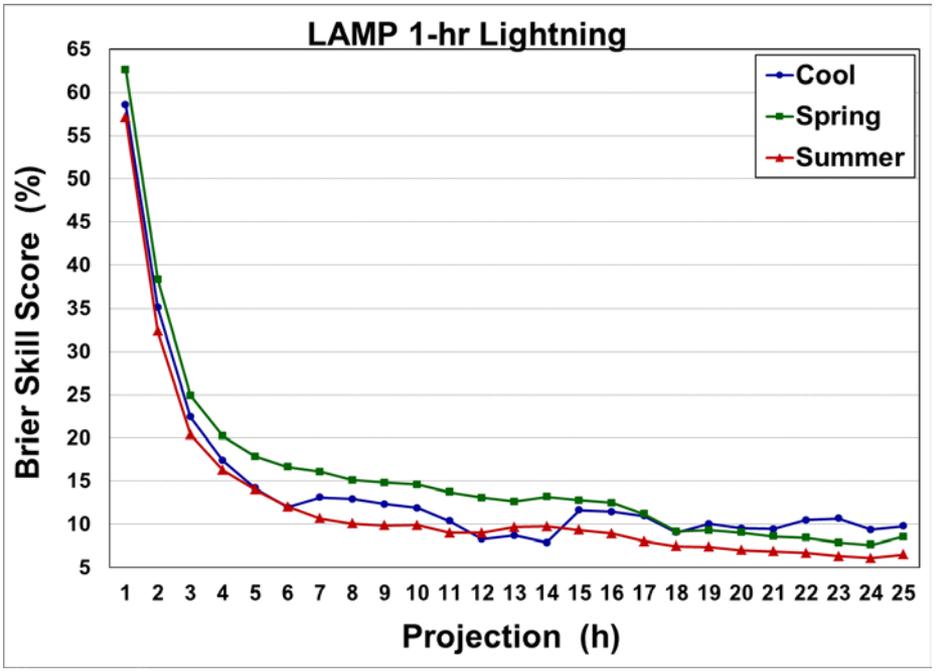
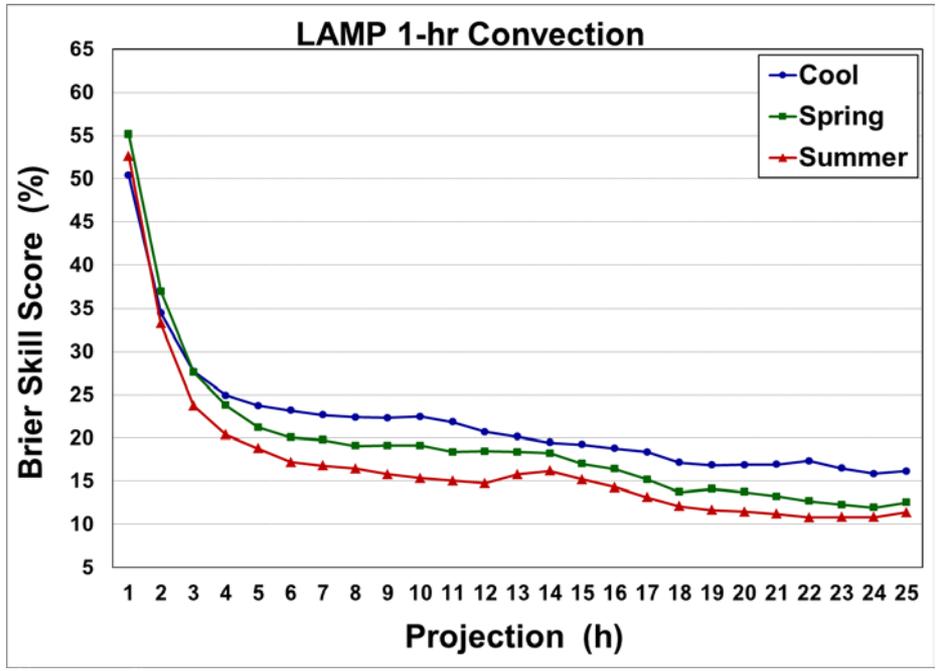
- 1h or 2h = 1-h or 2-h predictand valid period
- LAMP = 18z LAMP
- NAM MOS = 12z NAM-based MOS
- GFS MOS = 12z GFS-based MOS

Slide from AMS presentation: "LAMP Convection Probability and 'Potential' Guidance: An Experimental Hi-Res Upgrade" by Jess Charba, J. Ghirardelli, P. Shafer, F. Samplatsky, and A. Kochenash, AMS 23rd Conf. on Probability and Statistics in the Atmospheric Sciences.

Note: Verification based on preliminary development



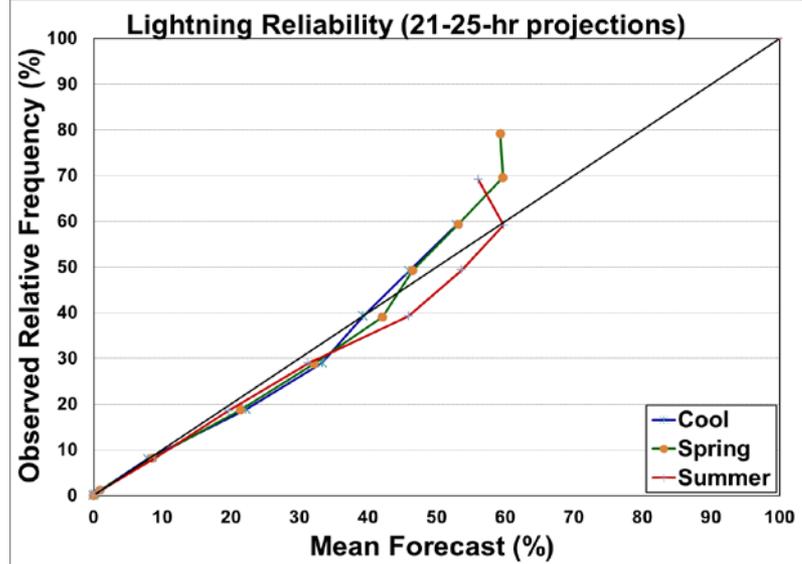
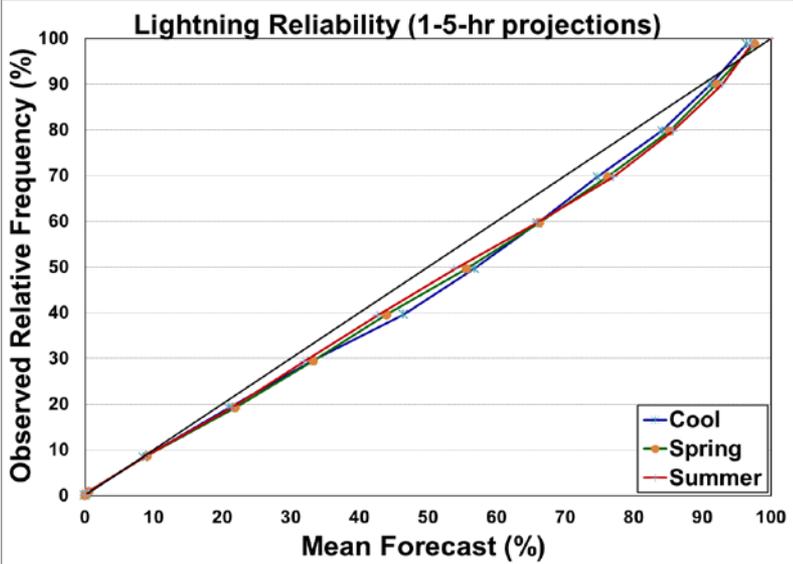
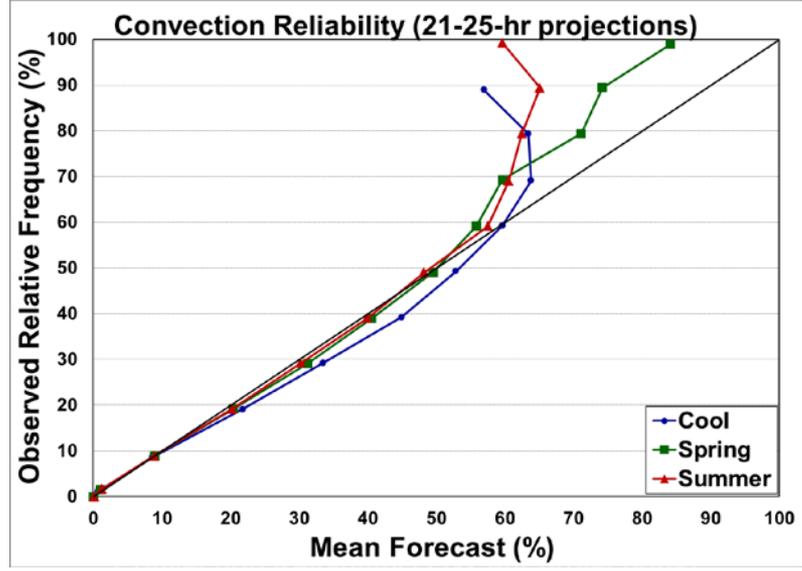
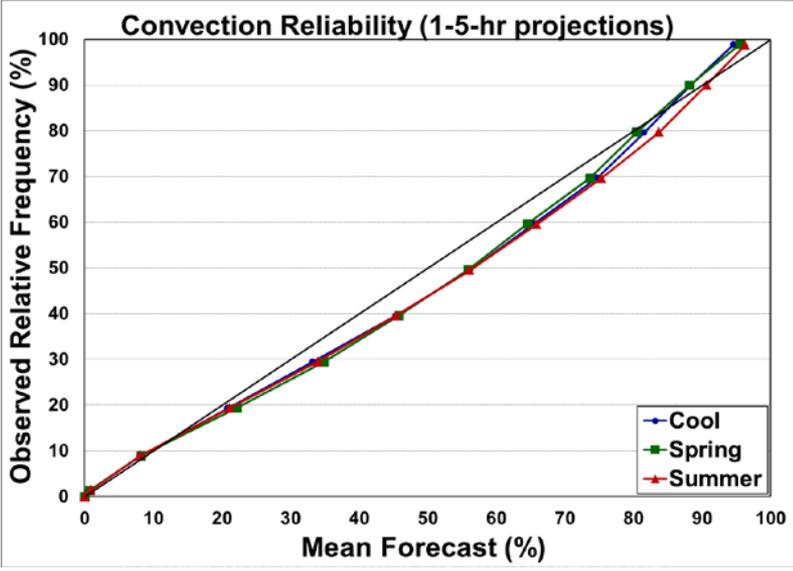
Convection and Lightning: Brier Skill Score



Verification of average of 0600 and 1800 UTC LAMP cycles



Convection and Lightning: Reliability



Verification of average of 0600 and 1800 UTC LAMP cycles



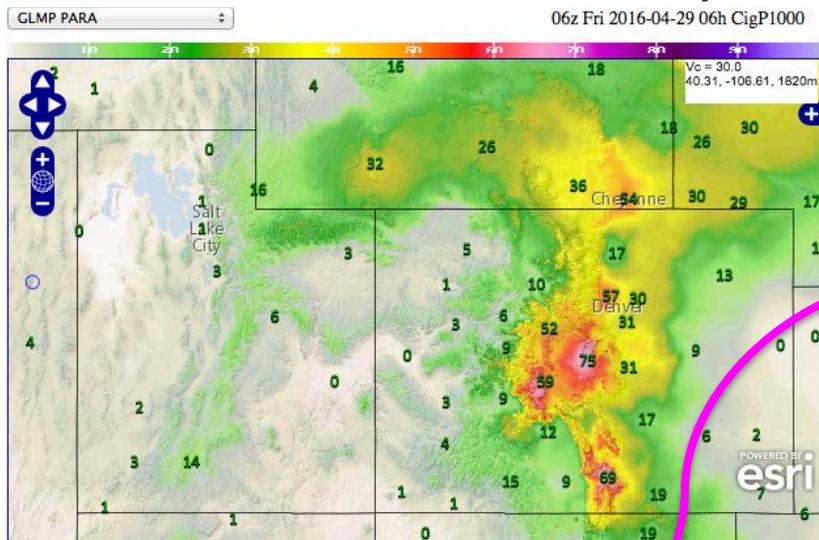
Development Details



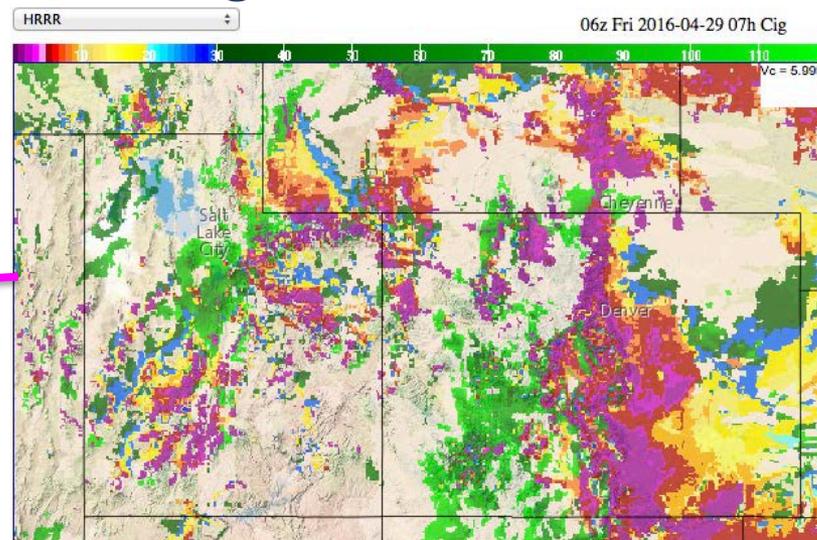
Ceiling and Visibility (aka LAMP/HRRR Meld) LAMP guidance:

- Improvements due to utilizing HRRR, second-order regression development
- Guidance:
 - Station: Probabilities, Categorical
 - Gridded: Probabilities, Continuous Value
- Development Period: April 2013 – March 2015
- Independent Period: 4 months withheld in above 2 cool seasons.
- Gridded LAMP Meld running experimentally for 24 cycles:
http://www.mdl.nws.noaa.gov/~rlamp/glmp_expr_viewer_meld.php
(LDAP credentials required)
- In process of making publically available images (FAA, PERTI)
- Regression development:
 - Inputs LAMP, HRRR, and observations
 - Equations developed at stations and evaluated at stations and at grid points
- Results in more accurate LAMP ceiling and visibility guidance

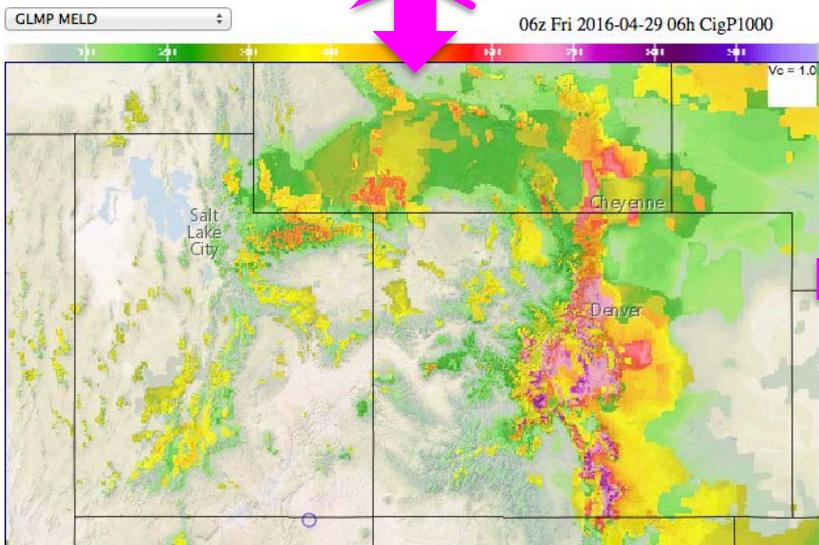
LAMP Probability Example: Ceiling < 1000 feet



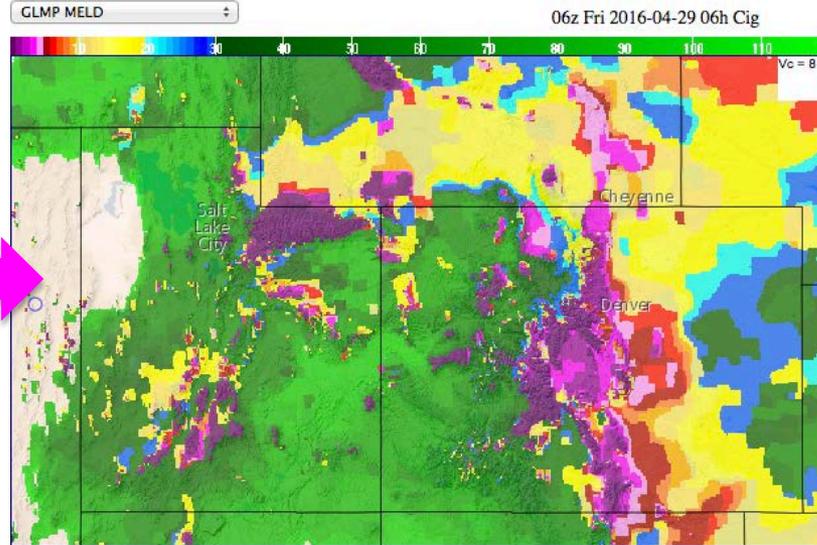
GLMP Para Prob CIG < 1000 ft



HRRR Ceiling Height



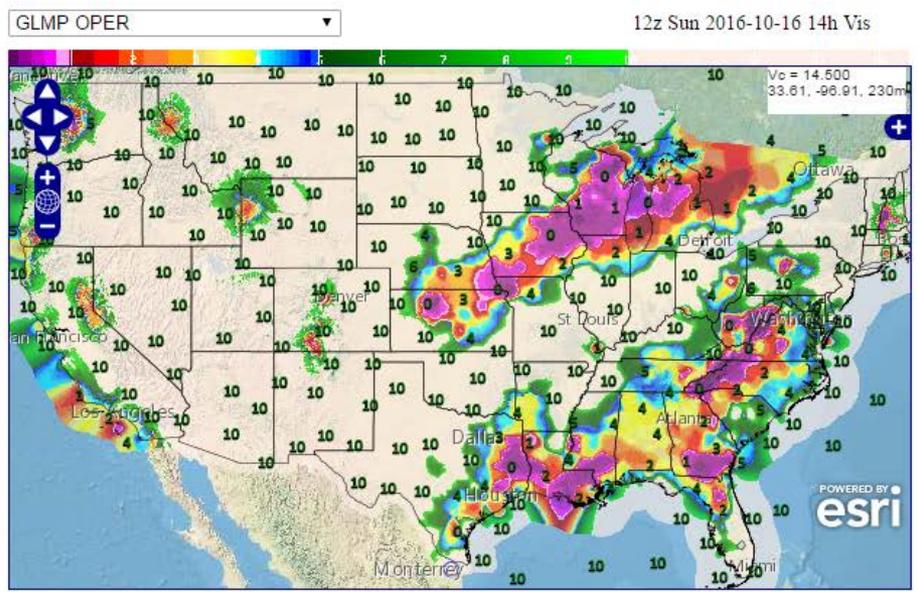
GLMP Meld Prob CIG < 1000 ft



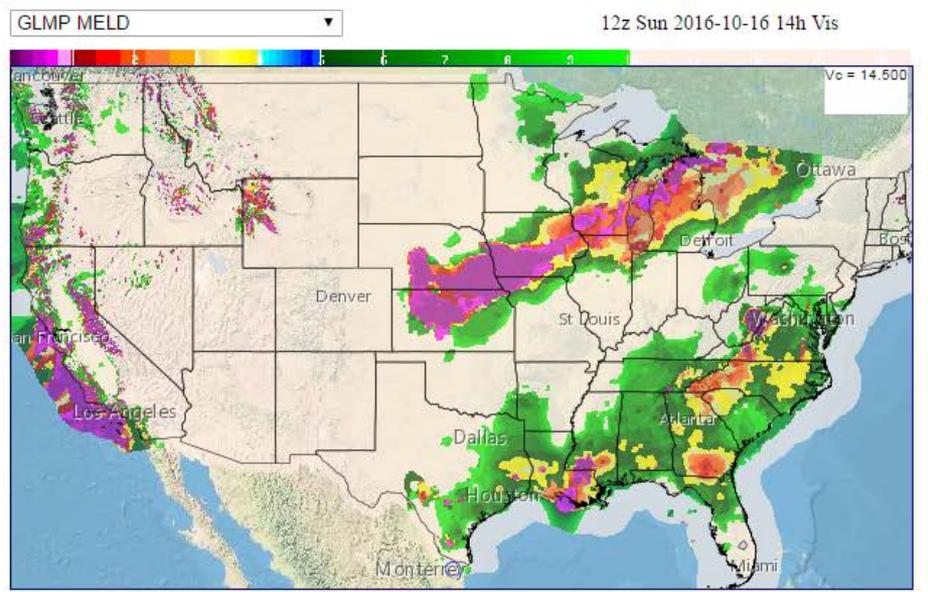
GLMP Meld Ceiling Height



Example Visibility



GLMP Visibility

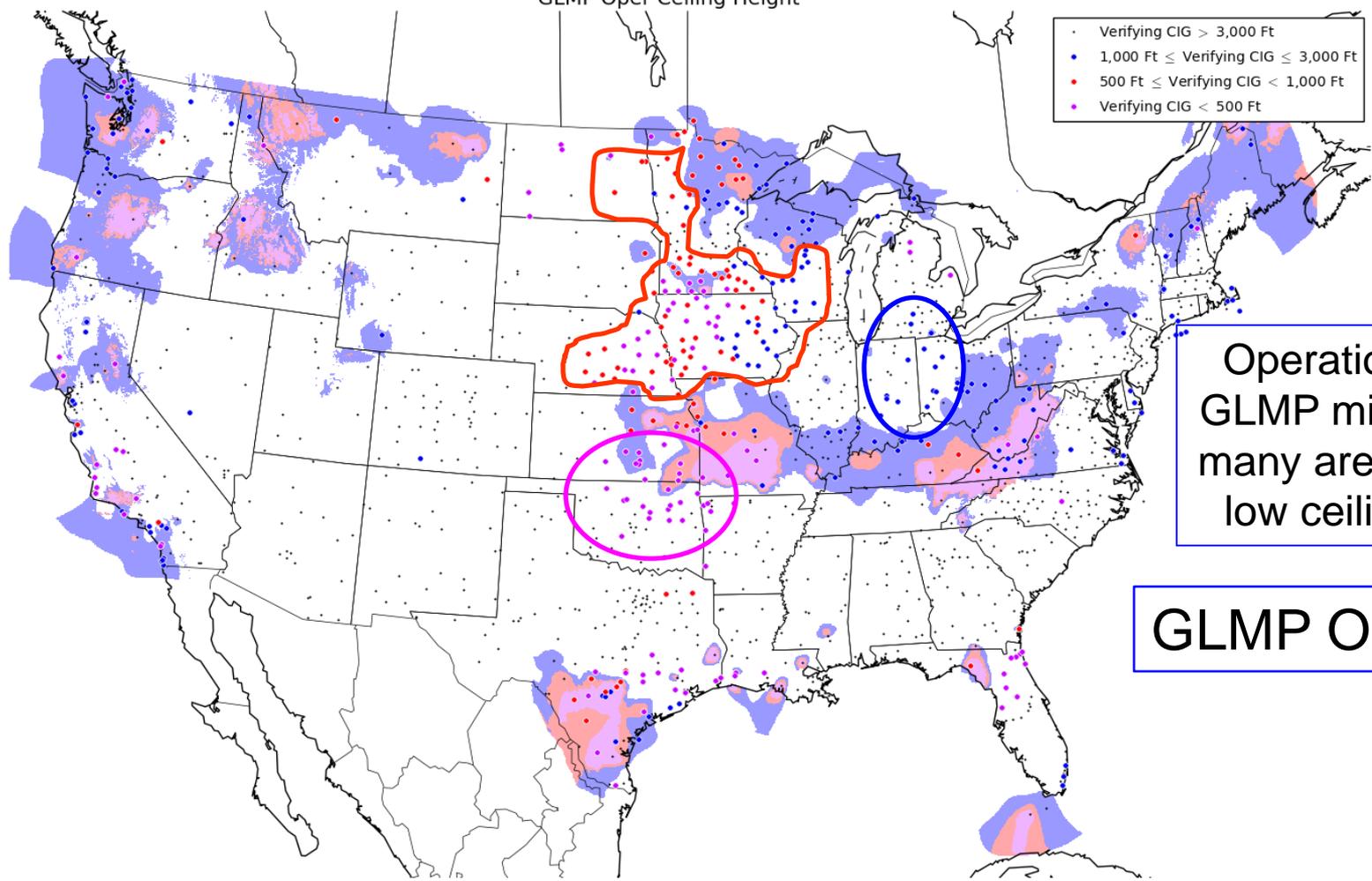


GLMP Meld Visibility



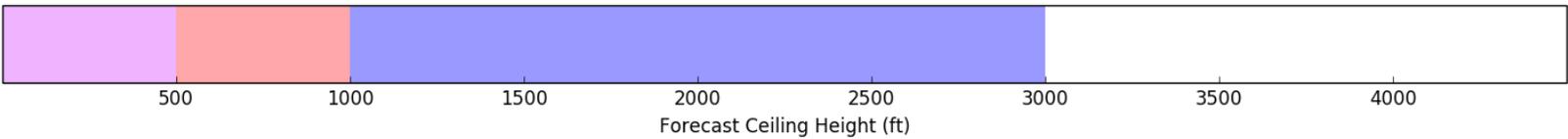
Example Ceiling (Verified)

10-hr Forecast Valid at 12z on October 31, 2016
GLMP Oper Ceiling Height



Operational
GLMP missed
many areas of
low ceilings

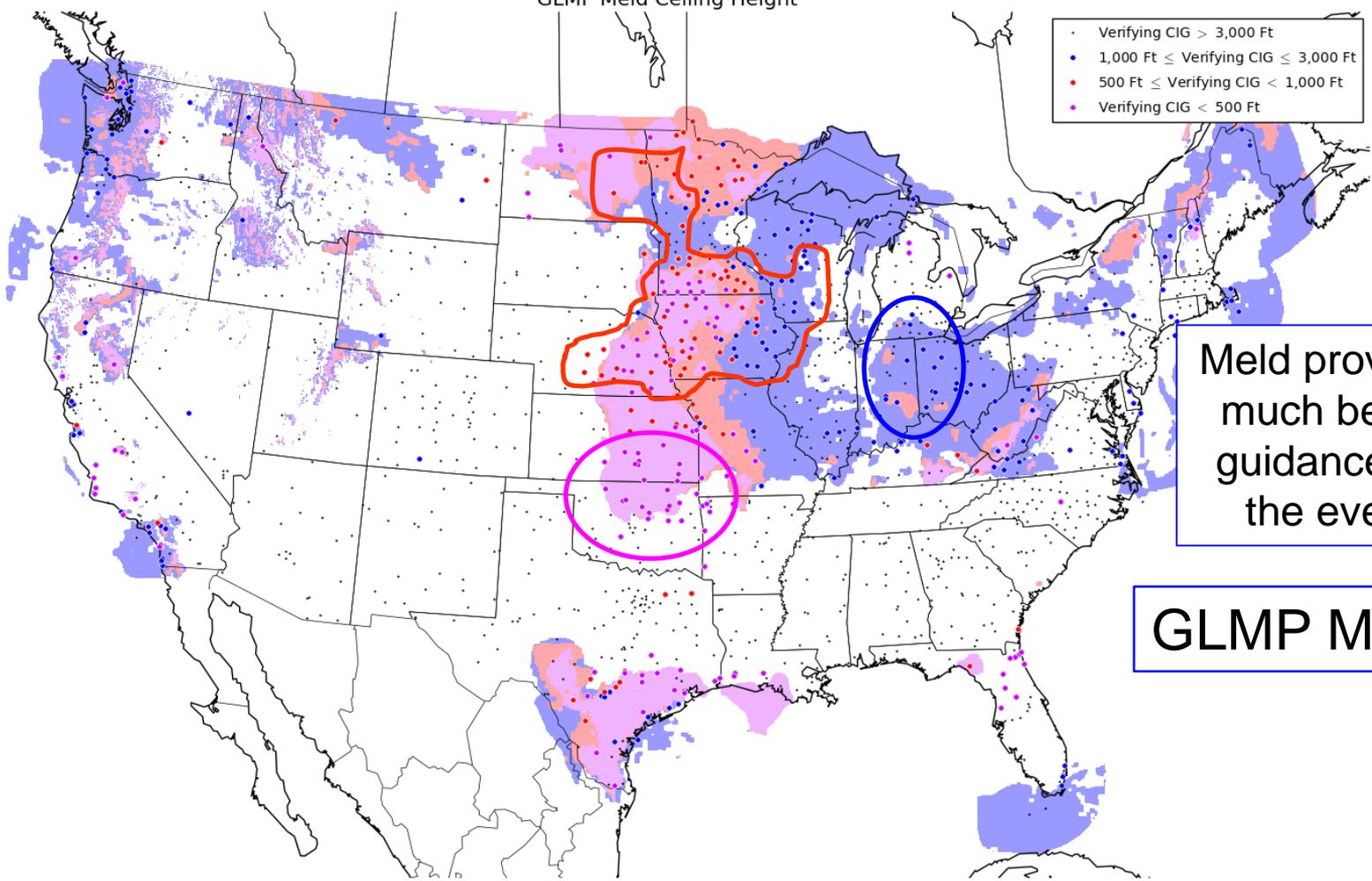
GLMP Oper





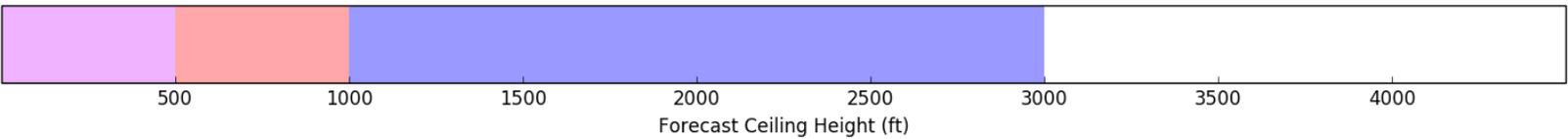
Example Ceiling (Verified)

10-hr Forecast Valid at 12z on October 31, 2016
GLMP Meld Ceiling Height



Meld provided much better guidance for the event

GLMP Meld



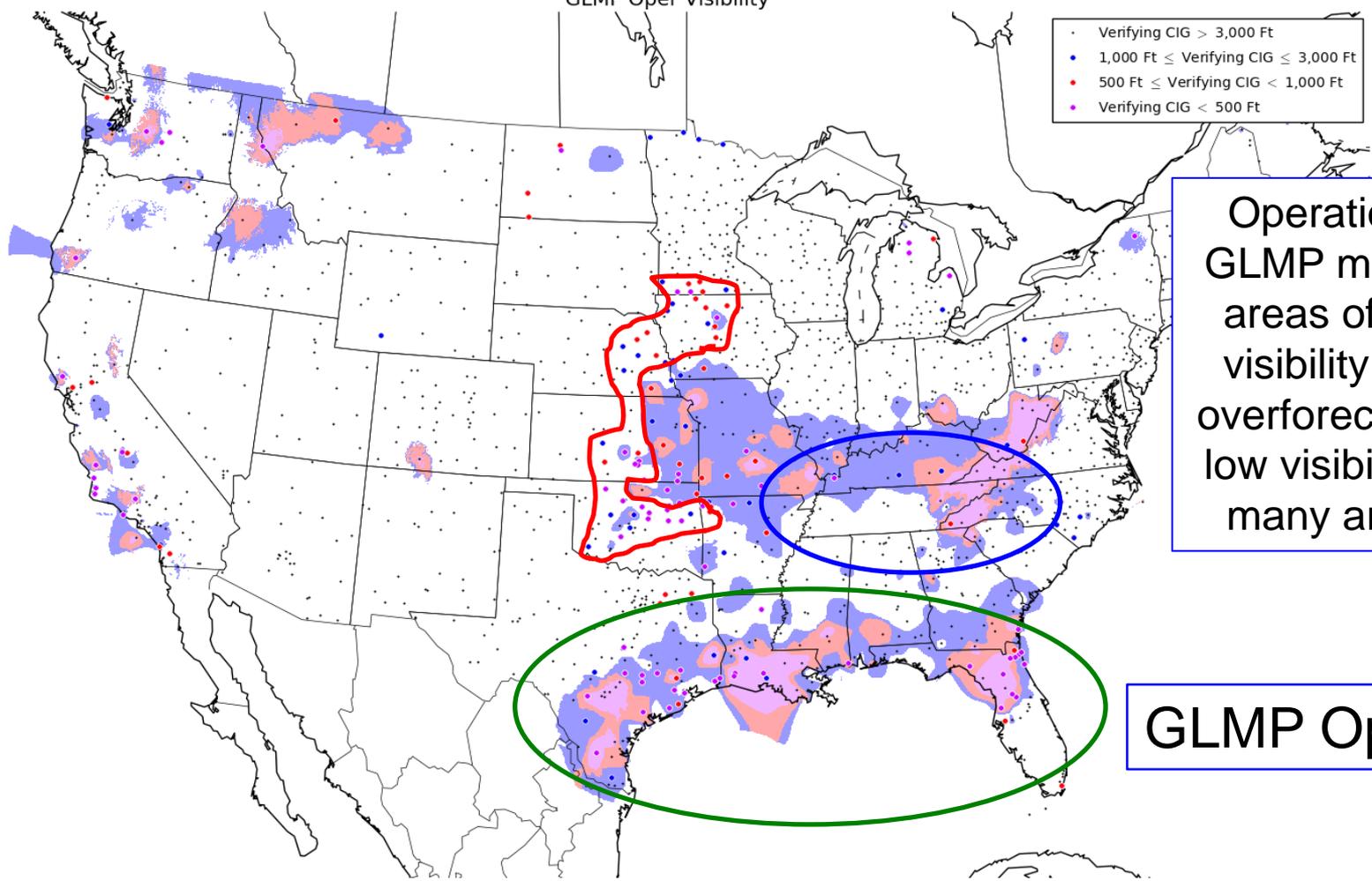


Example Visibility (Verified)

10-hr Forecast Valid at 12z on October 31, 2016

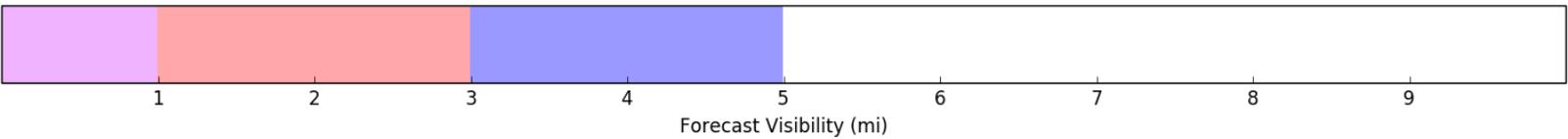
GLMP Oper Visibility

- Verifying CIG > 3,000 Ft
- 1,000 Ft ≤ Verifying CIG ≤ 3,000 Ft
- 500 Ft ≤ Verifying CIG < 1,000 Ft
- Verifying CIG < 500 Ft



Operational GLMP missed areas of low visibility and overforecasted low visibility in many areas

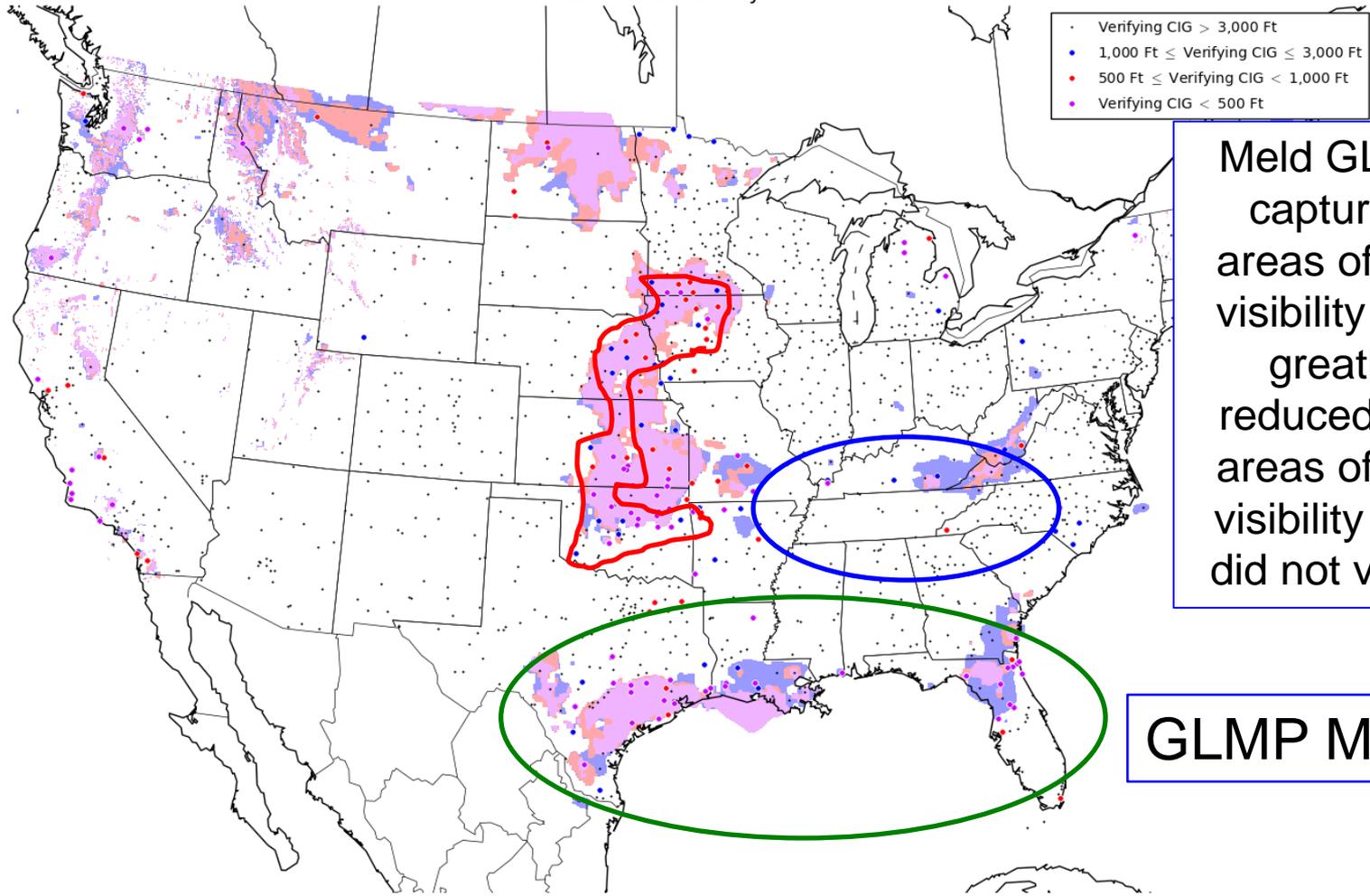
GLMP Oper





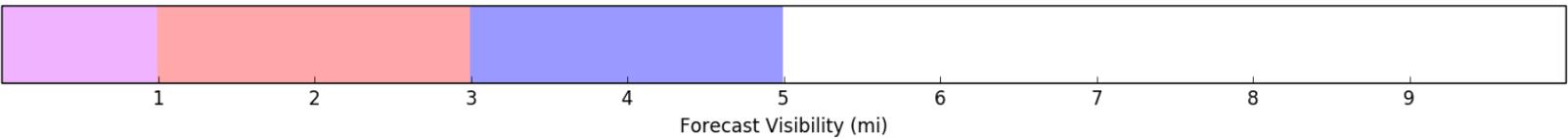
Example Visibility (Verified)

10-hr Forecast Valid at 12z on October 31, 2016
GLMP Meld Visibility



Meld GLMP captured areas of low visibility and greatly reduced the areas of low visibility with did not verify

GLMP Meld

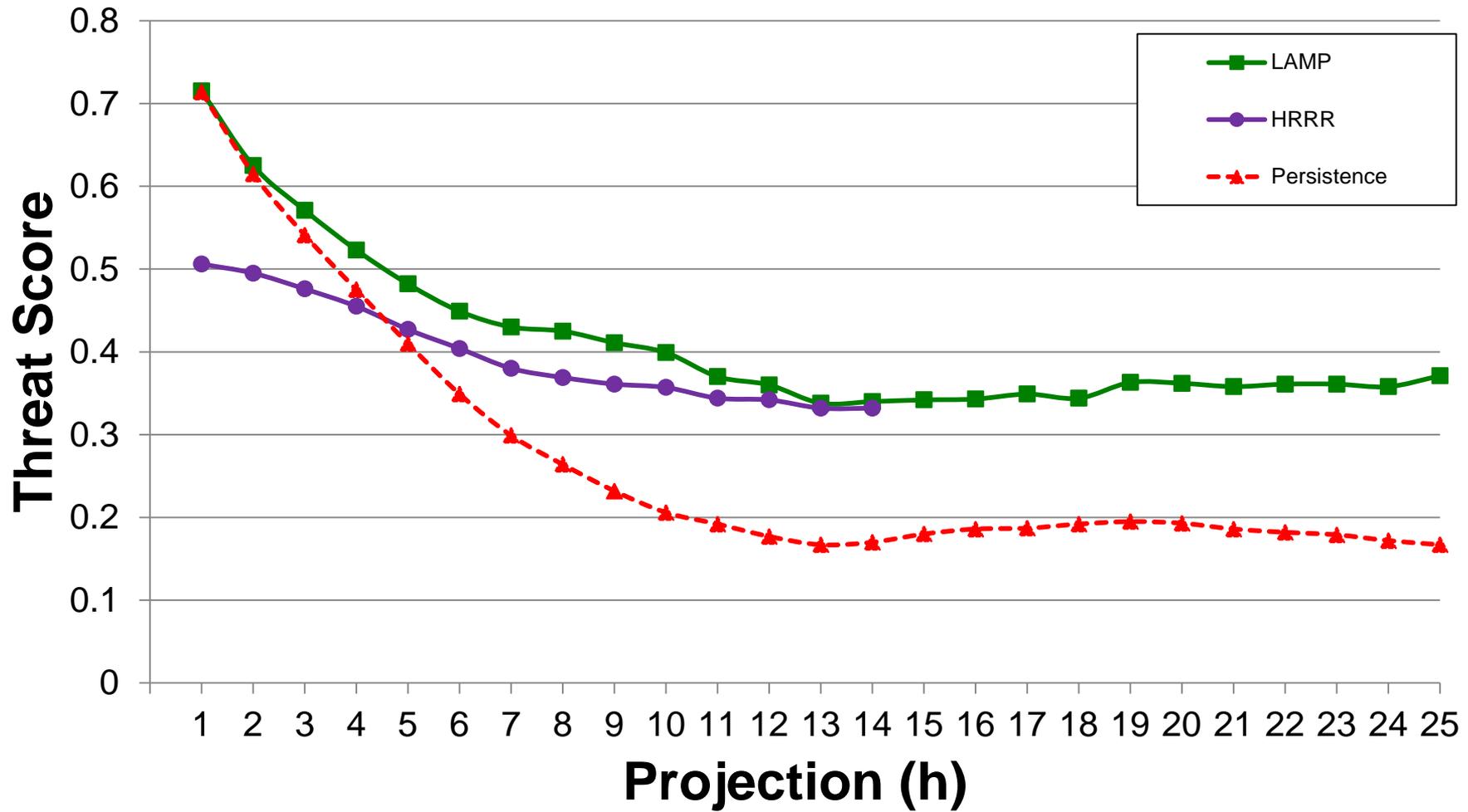




Ceiling & Visibility: Threat Scores



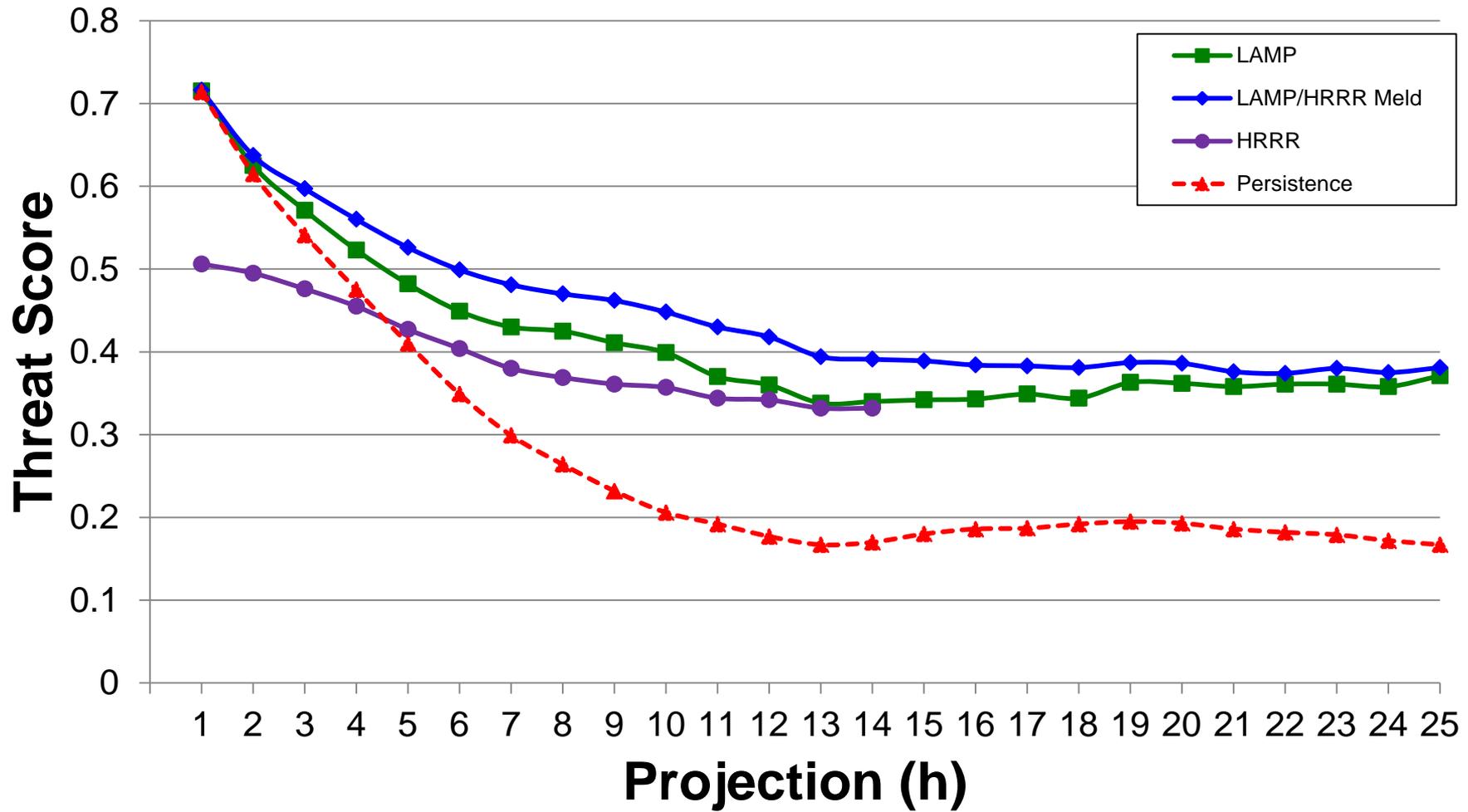
Threat Score: Ceiling < 1,000 FT
1200 UTC Cyle, Cool Season





Ceiling & Visibility: Threat Scores

Threat Score: Ceiling < 1,000 FT
1200 UTC Cyle, Cool Season

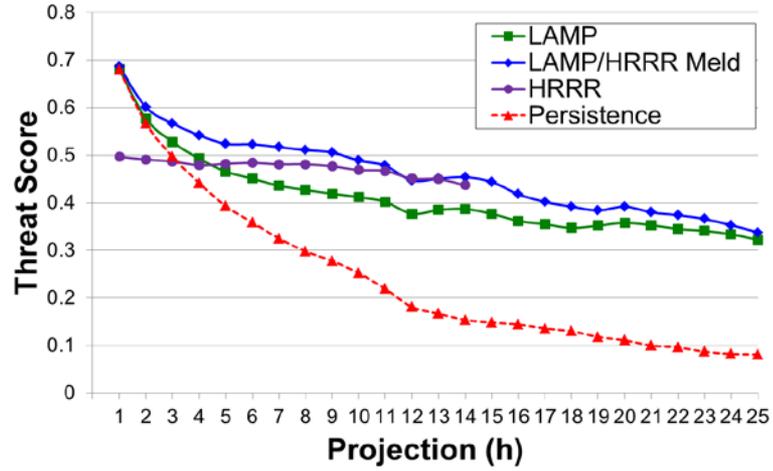




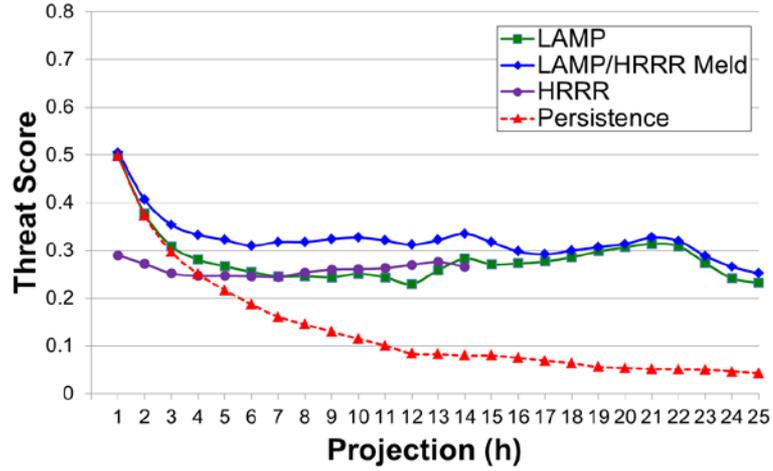
Ceiling & Visibility: Threat Scores



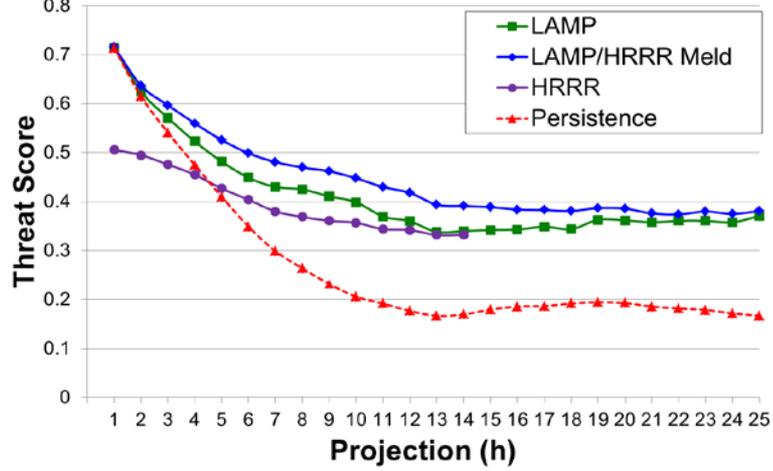
Threat Score: Ceiling Height < 1,000 FT 0000 UTC Cycle, Cool Season



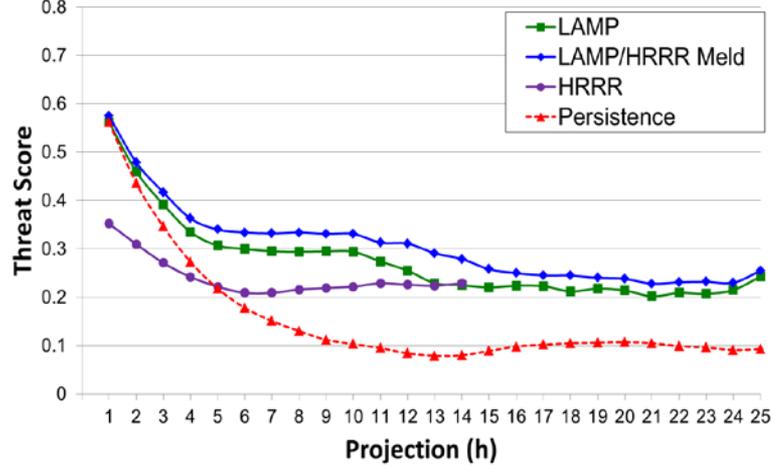
Threat Score: Visibility < 3 MI 0000 UTC Cycle, Cool Season



Threat Score: Ceiling < 1,000 FT 1200 UTC Cycle, Cool Season

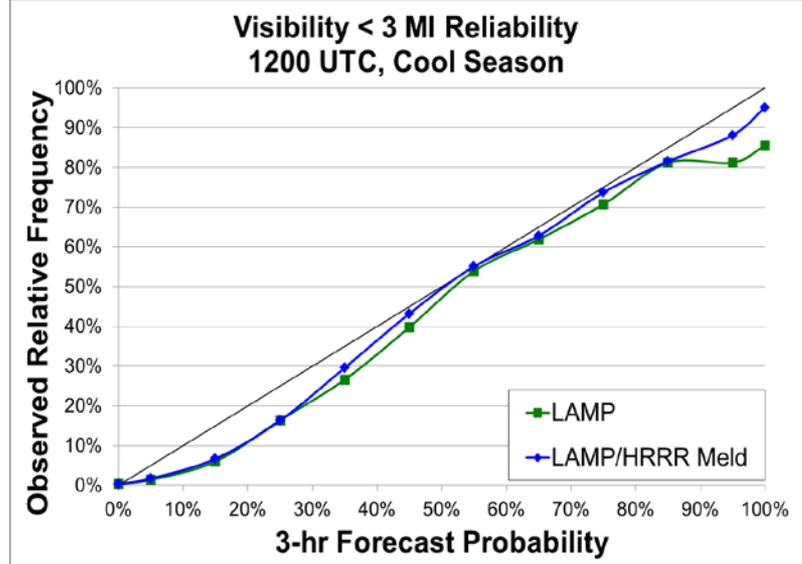
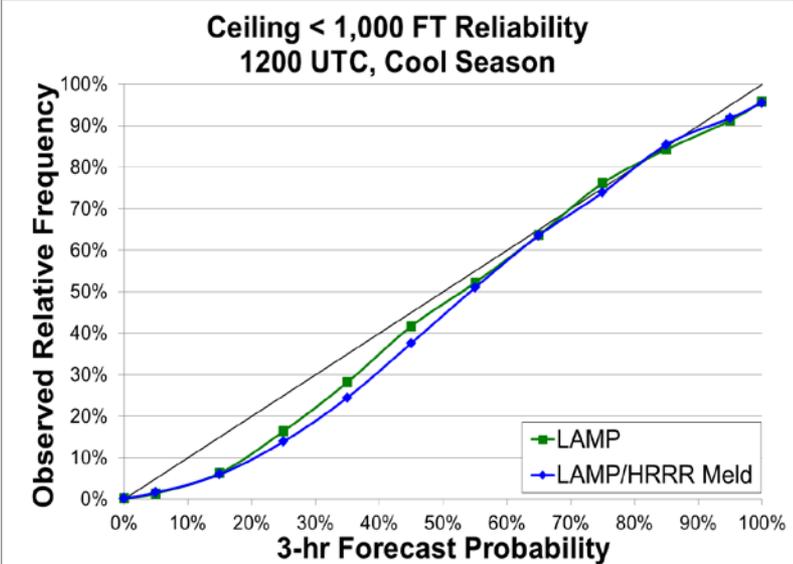
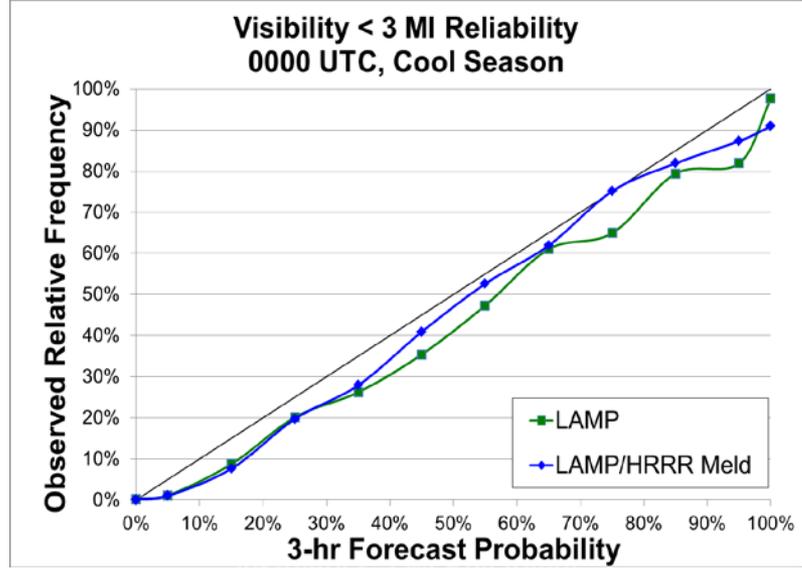
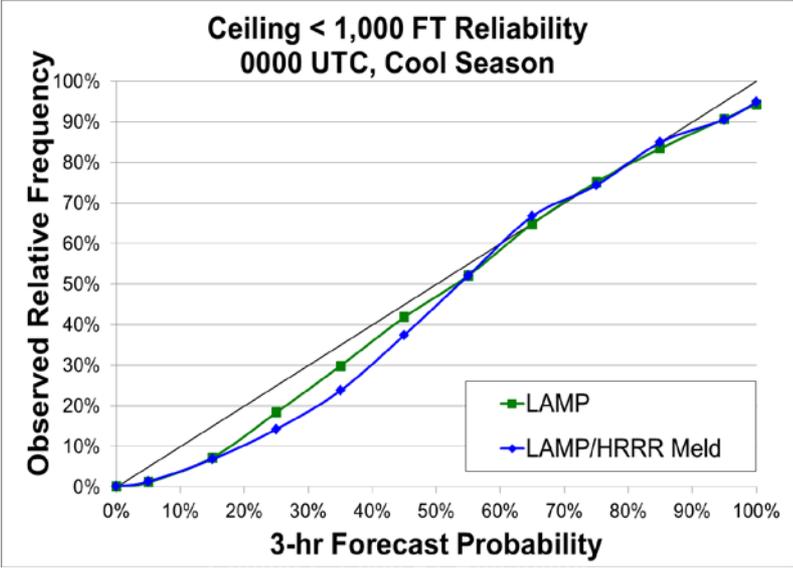


Threat Score: Visibility < 3 MI 1200 UTC Cycle, Cool Season



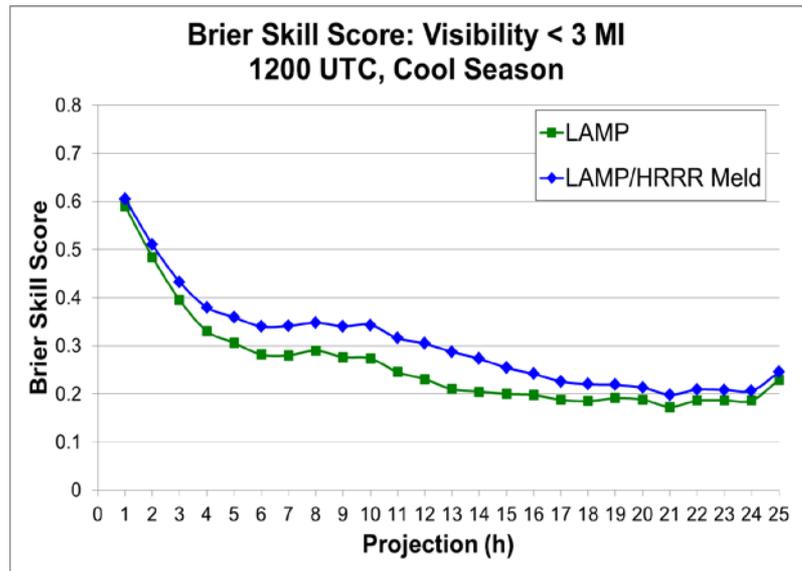
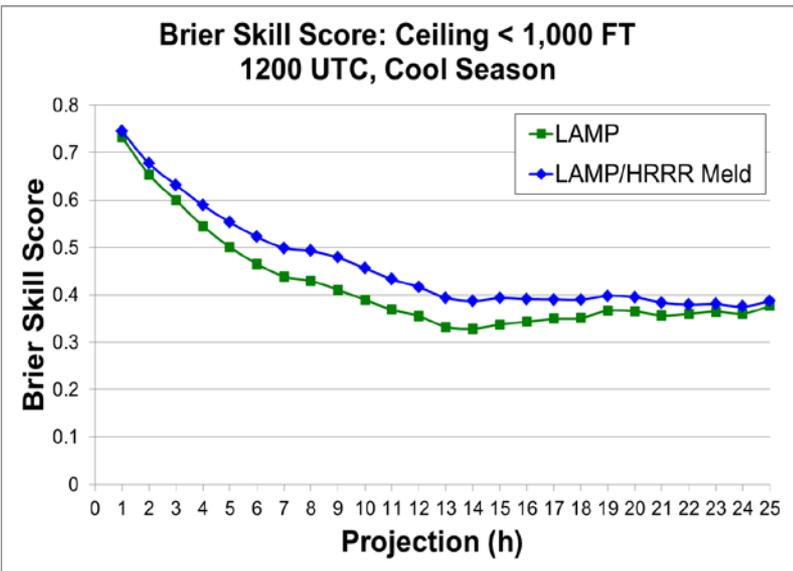
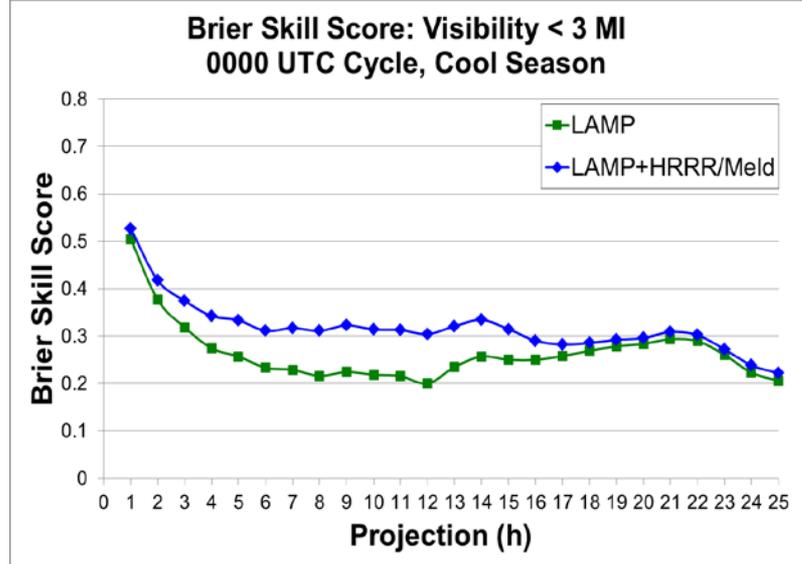
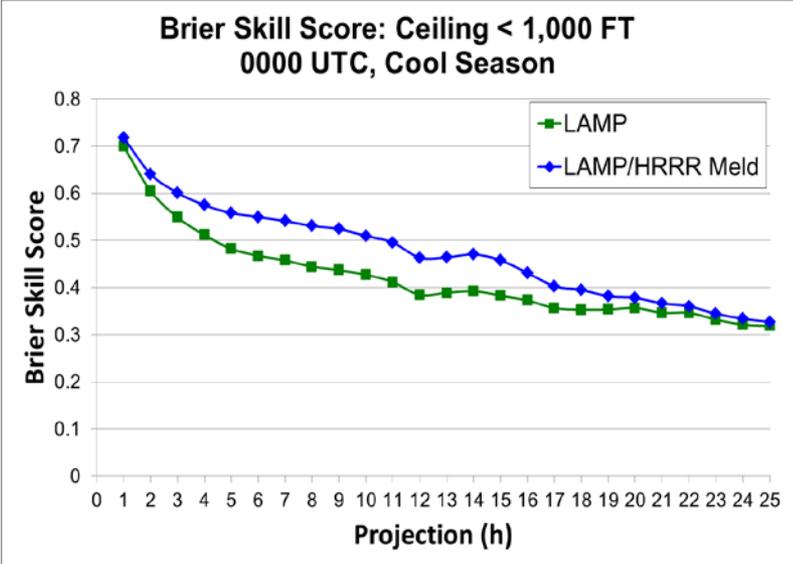


Ceiling & Visibility: Reliability Scores





Ceiling & Visibility: Brier Skill Score





Summary



LAMP/HRRR v2.0.0 Implementation

- Improvements due to utilizing HRRR, MRMS, TL
- Results in more accurate LAMP ceiling and visibility guidance
- Results in better temporal (1-hr projections) and spatial resolution of convection and lightning guidance
- Very positive feedback from:
 - WFOs
 - AWC
 - FAA
- Code handoff 11/29/2016
- Implementation March 2017