CURRENT STATUS AND PLANS FOR THE LOCALIZED AVIATION MOS PROGRAM (LAMP) FOR AVIATION FORECASTING*

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A.42

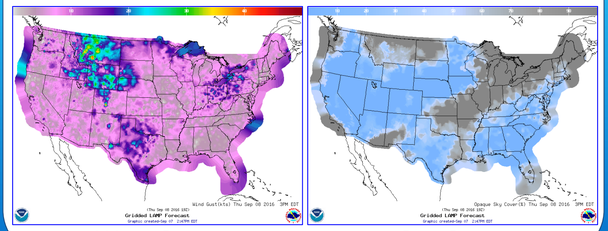
Background

- LAMP provides objective forecast guidance for the aviation community
- LAMP is produced hourly in NWS operations
- LAMP uses the most recent surface observations to bridge the gap between the observations and the MOS forecast
- LAMP provides station-based guidance of sensible weather, including ceiling height and visibility, out 25 hours for 1678 stations in the CONUS, AK, HI, and Puerto Rico
- Gridded LAMP (GLMP) provides gridded guidance for:
  - Lightning (at least one CTG ltg strike)
  - Convection (at least one CTG strike and/or radar reflectivity of at least 40 dBZ)
  - 2-m Temperature
  - 2-m Dewpoint
  - Ceiling Height
  - Visibility
  - Sky Cover
  - Wind Speed & Dir

  New: Oct. 2015!!
  - Wind Gusts
  - Ceiling Probabilities
  - Visibility Probabilities

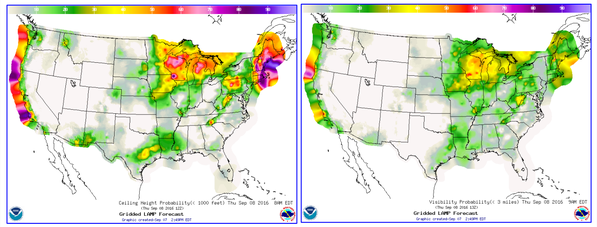
  New: Jun. 2016!!
- Improvements to LAMP/GLMP have been achieved via incorporation of data from the High Resolution Rapid Refresh (HRRR) model, Multi-Radar/Multi-Sensor System (MRMS) data, and Total Lightning (TL) data from Earth Networks, Inc. (ENI)

Examples of New GLMP Guidance Elements:



Wind Gusts | Sky Cover

Examples of New GLMP Guidance Elements:



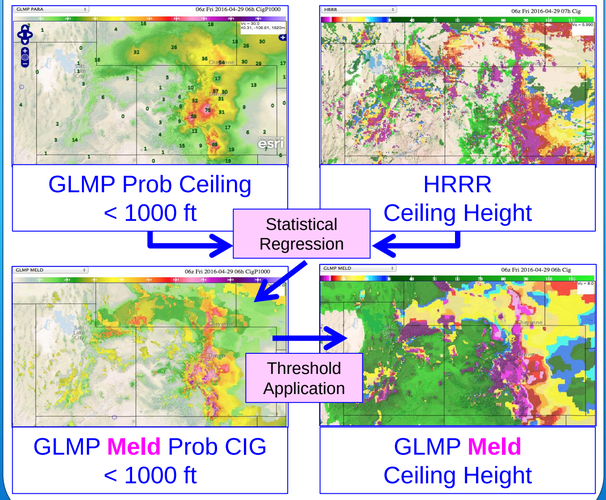
Prob Ceiling < 1000 ft | Prob Visibility < 3 mi

LAMP Ceiling & Visibility (C&V)

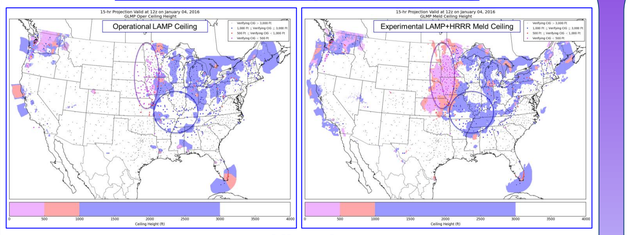
Improvement Approach

- Statistically Blending LAMP data with HRRR data → LAMP+HRRR Meld
- Regression Analysis:
  - Predictand Data: METAR Observations
  - Predictor Data:
    - LAMP Cumulative C&V Probabilities
    - Computed probabilities from previous 3 HRRR runs
    - Observations
  - Generalized Operator Approach → many cases

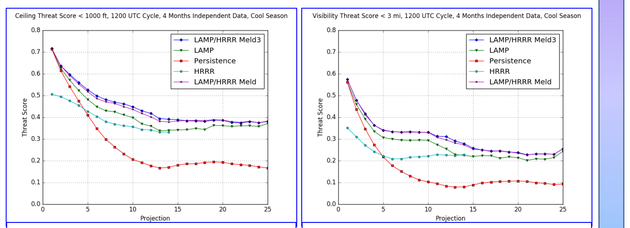
GLMP Meld Example: Ceiling < 1000 feet



Meld Case Example for Ceiling



Verification



CIG < 1000 ft | VIS < 3 mi

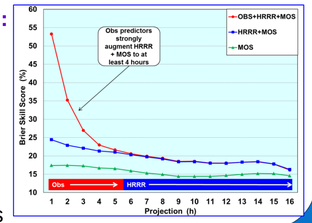
LAMP Convection & Lightning *

Improvement Approach

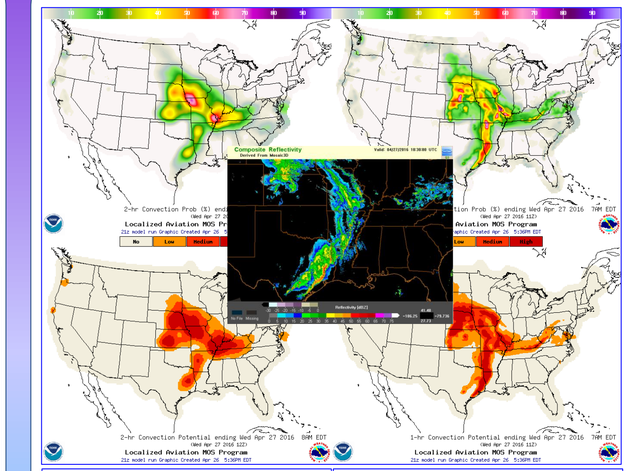
- Predictand Definitions:
  - Lightning: One or more total lighting (TL) flashes
  - Convection: MRMS reflectivity 40 dBZ or higher and/or one or more total lighting (TL) flashes
- Statistically Blending:
  - MRMS observed and advected grids
  - Total Lightning observed and advected grids
  - HRRR Model Output
  - GFS MOS and NAM MOS
- Development details:
  - 1-h valid periods instead of 2-h periods
  - Probabilities produced on 10-km grid

Contribution of Predictors:

- Obs predictors dominate from 1 - 4 hrs
- HRRR predictors dominate from 4 - 17 hrs
- GFS and NAM MOS probability predictors dominate from 15 - 25 hrs



Convection Case Example



Operational | Experimental

Future Work

- Update station lists to add new stations to LAMP
- Redevelop LAMP station-based T/D/Winds/Ceiling/Vis
- Produce LAMP rapidly updating C&V every 15 mins 0-2 hrs
- Develop GLMP via the "Meld" approach for additional elements such as 1-h PoPs and precipitation type

Schedule

- GLMP Probabilistic C&V Grids: Added Jun. 2016
- LAMP/HRRR/MRMS C&V and Convection & Lightning implementation: Planned Mar. 2017
- LAMP rapidly updating C&V: Planned Jun. 2017
- Updating station list and redevelop LAMP station-based T/Td/W/C/V: Planned Dec. 2018

Conclusions

- LAMP ceiling and visibility:
  - Post-processing HRRR and LAMP together yields improved guidance
  - Improvement expected at stations and on the grid from second order LAMP+HRRR Meld equations
- LAMP convection and lightning:
  - Improved via incorporation of HRRR, MRMS, TL
  - Increased spatial and temporal resolution

http://www.weather.gov/mdl/lamp_home

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* See poster A.41 for more information