

Gridded Localized Aviation MOS Program (LAMP) Guidance for Aviation Forecasting

Judy E. Ghirardelli and Bob Glahn

National Weather Service
Meteorological Development Laboratory

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LAMP/Gridded LAMP (GLMP)

- LAMP:

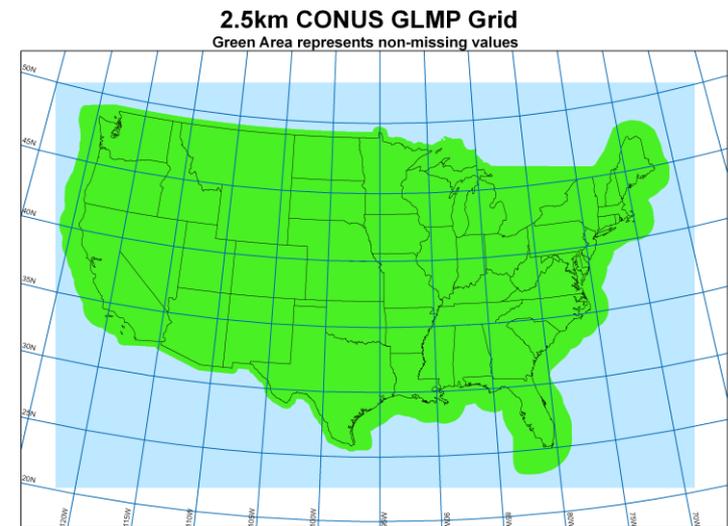
- Guidance of sensible weather at stations
- Guidance of thunderstorms (≥ 1 CTG lightning strike) on grid

- GLMP: Gridded observations and Gridded LAMP forecasts of:

- Temperature
- Dewpoint
- Ceiling Height (100's of ft)
- Visibility (miles)
- Other elements later

- Status:

- GLMP running experimentally at NCEP as of 9/28/2010, will be operational 9/27/2011
- Data available in Experimental NDGD
- Available in MDL's test Web Coverage Service
- Exp. GLMP grids can be brought into AWIPS via the LDM data feed
- Can be used in the creation of NWS digital aviation products
- Images available on LAMP web page
- Will be available via the NextGen 4-D Data Cube

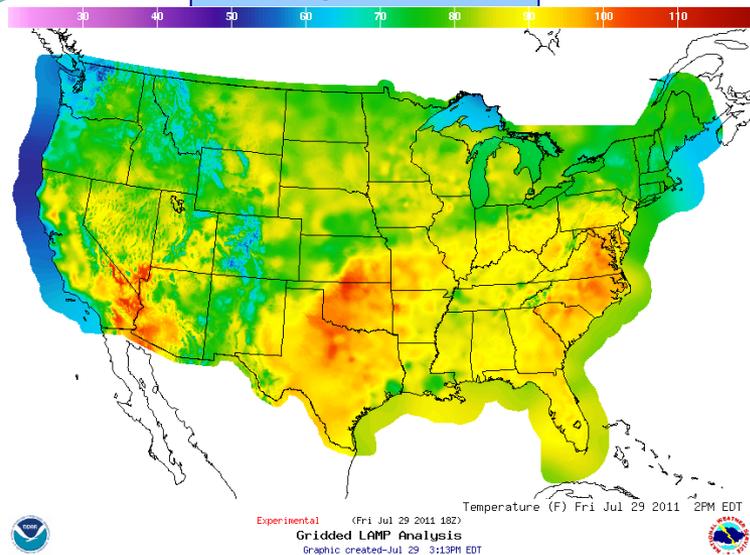


Gridded LAMP Details

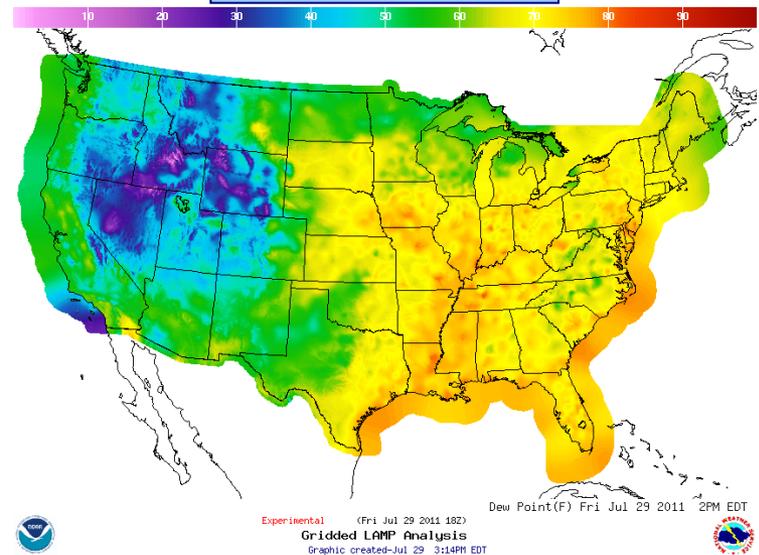
- Gridded LAMP analyses of observations – for checkout and verification
 - **Temperature and Dewpoint:**
 - Observations from METAR, Mesonet, synoptic stations, C-MAN, tide gauges, and moored buoys (Roughly 10,000 – 12,000 observations per hour)
 - Error estimates of temperature and dewpoint available in gridded format
 - **Ceiling Height and Visibility:**
 - Observations from METAR
- Gridded Analysis of LAMP forecasts
 - **Temperature and dewpoint:**
 - Continuous values are analyzed
 - < 1500 LAMP stations (input points) in CONUS, so SREF forecasts are used to augment LAMP forecasts
 - **Ceiling Height and Visibility:**
 - Categorical values are converted to continuous values
 - No augmentation

Gridded LAMP: 0-25 hours

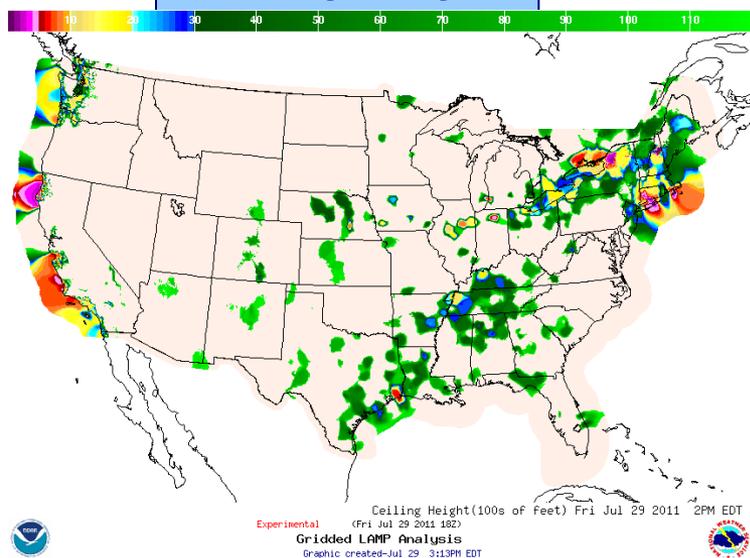
Temperature



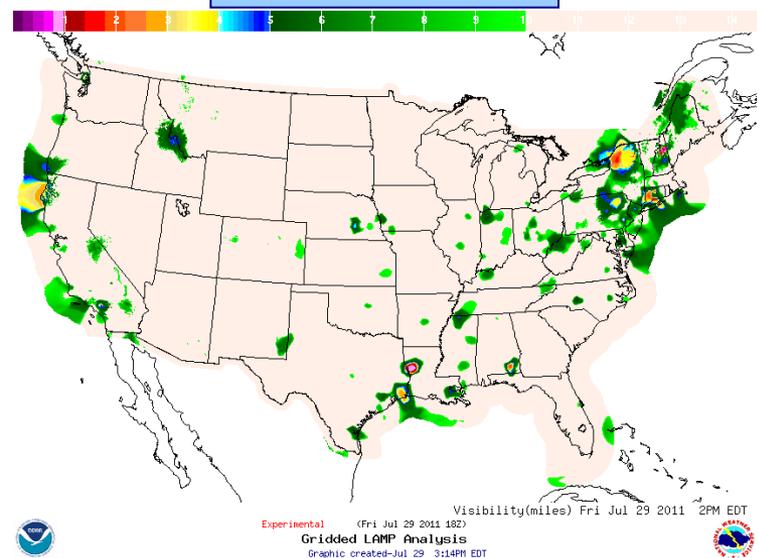
Dewpoint



Ceiling Height



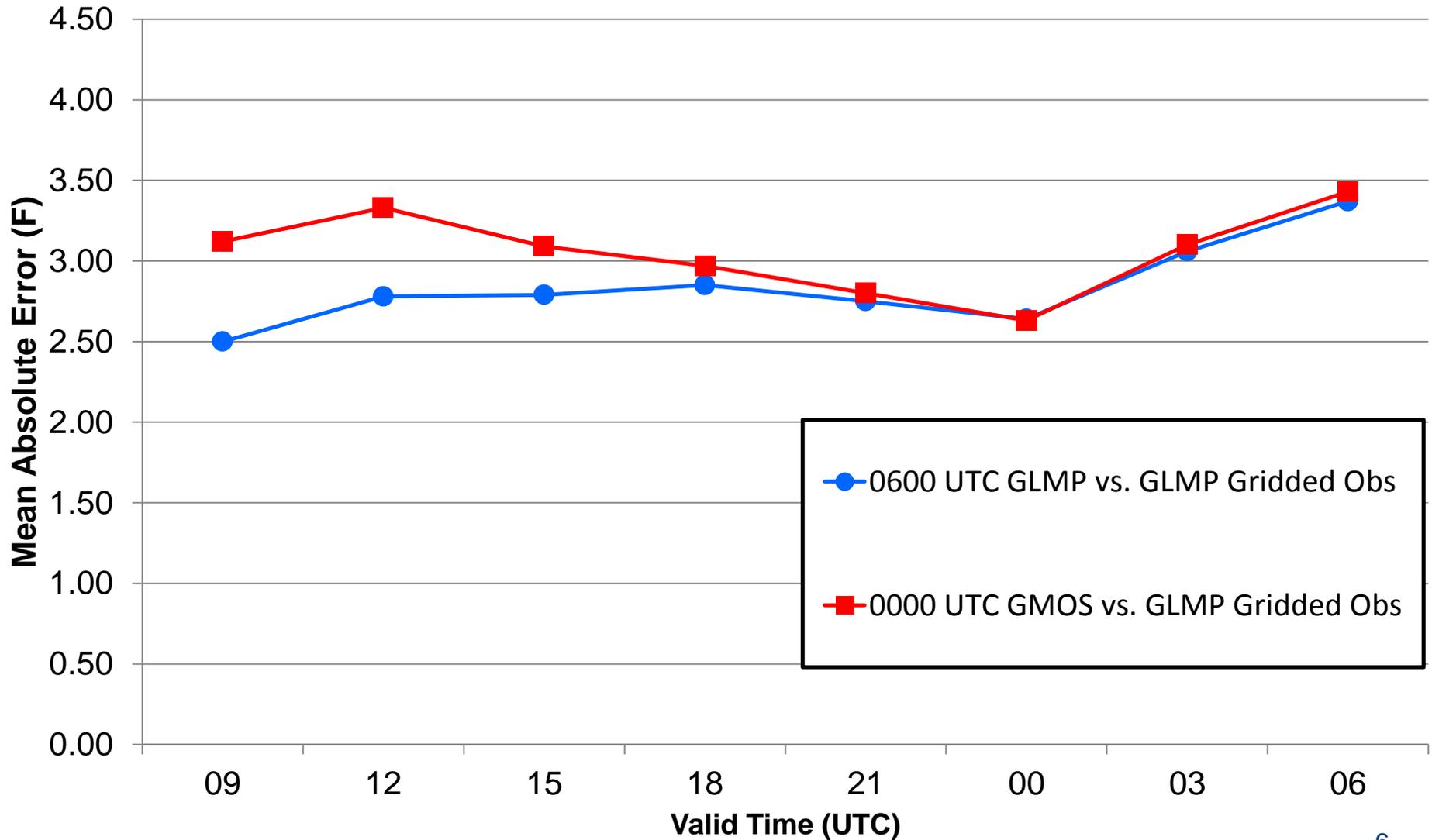
Visibility



Temperature and Dewpoint Gridded Verification

- Compared GLMP vs. GMOS
 - 0600 UTC GLMP vs 0000 UTC GMOS
 - 1800 UTC GLMP vs 1200 UTC GMOS (in paper)
- Data Sample: November-December 2010
- Area: CONUS, 2.5-km grid
- Variables: Temperature (Dewpoint results shown in paper)
- Verification using two methods:
 - GLMP 0-hr gridded observations
 - RTMA
- Computed:
 - MAE over all gridpoints
 - Fractional Improvement in MAE of GLMP over GMOS at each gridpoint
- Purpose: to determine if GLMP improves on GMOS as LAMP improves on MOS

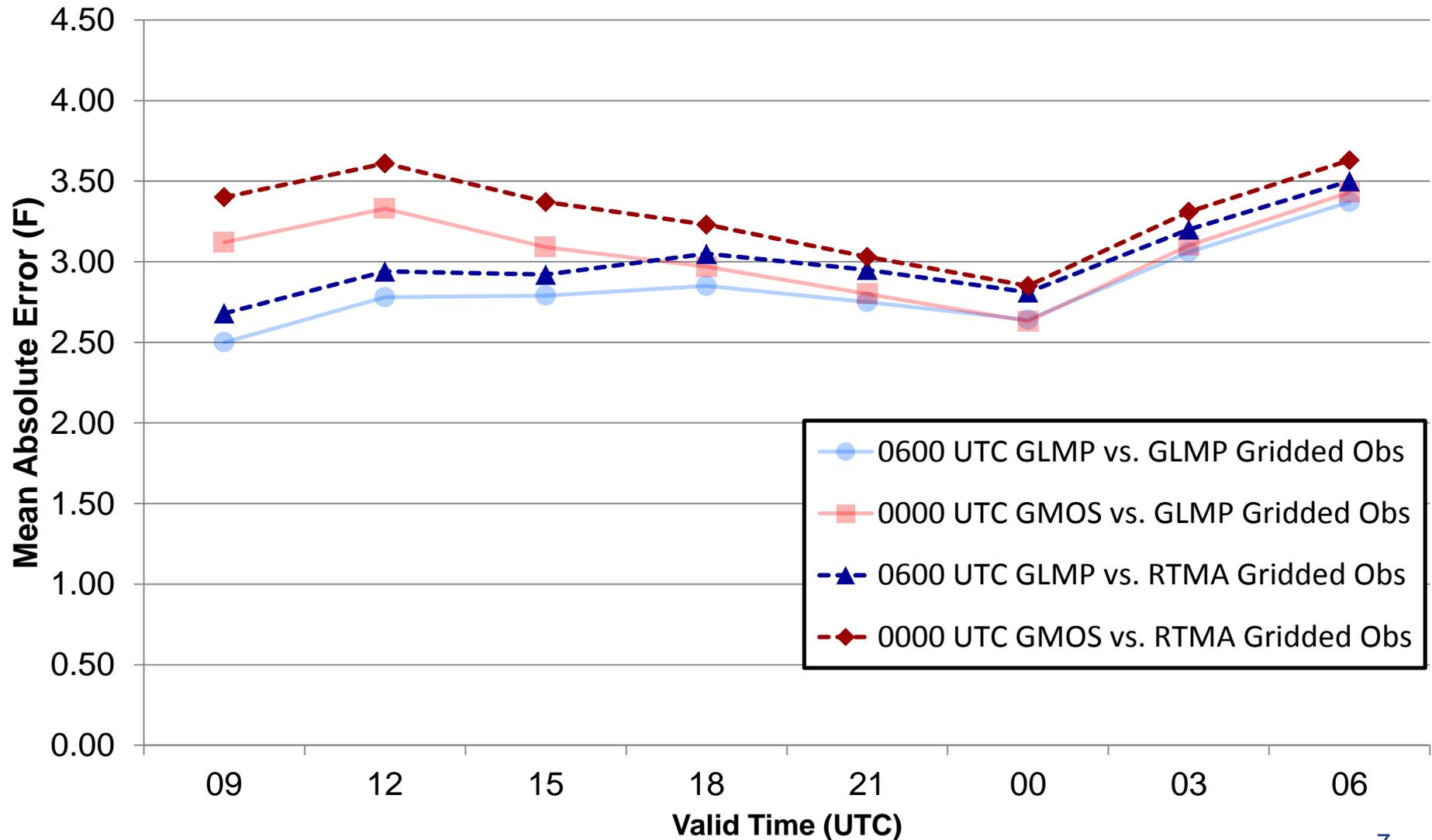
MAE over all gridpoints 0600 UTC Gridded LAMP Verification Temperature - All Regions



MAE over all gridpoints

0600 UTC Gridded LAMP Verification

Temperature - All Regions



Fractional improvement in MAE of GLMP over GMOS at gridpoints

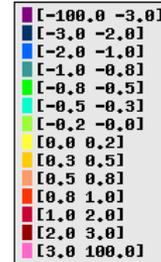
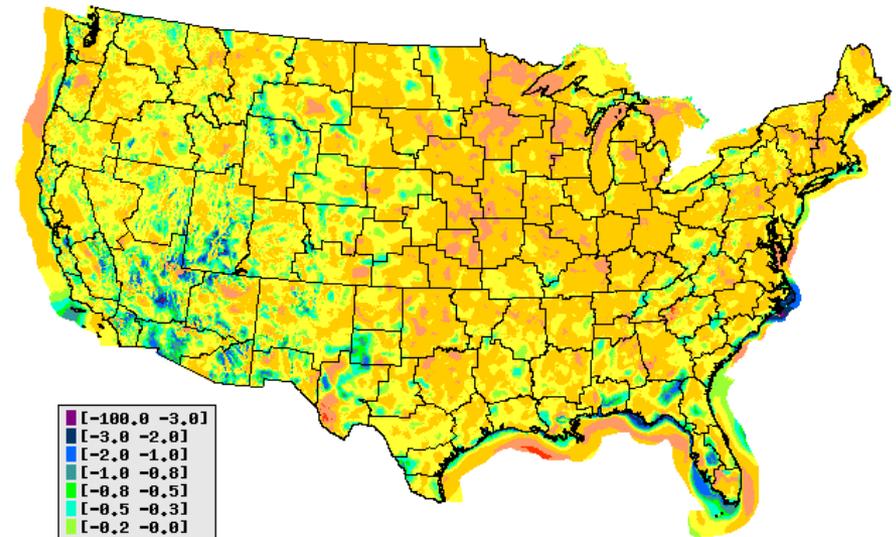
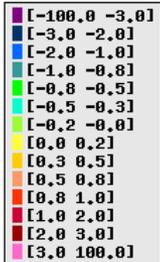
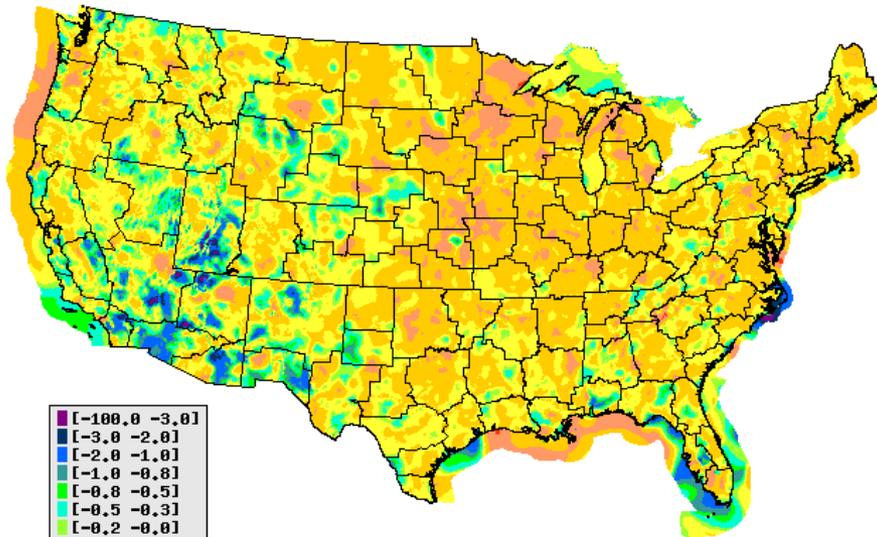
(3-hr forecast from 0600 UTC GLMP)



Fractional MAE Improvement
TEMP GLMP vs GMOS Forecasts (GLMP Obs)
Valid 09 UTC GLMP 06 UTC Ref. Time
Nov-Dec 2010



Fractional MAE Improvement
TEMP GLMP vs GMOS Forecasts (RTMA Obs)
Valid 09 UTC GLMP 06 UTC Ref. Time
Nov-Dec 2010

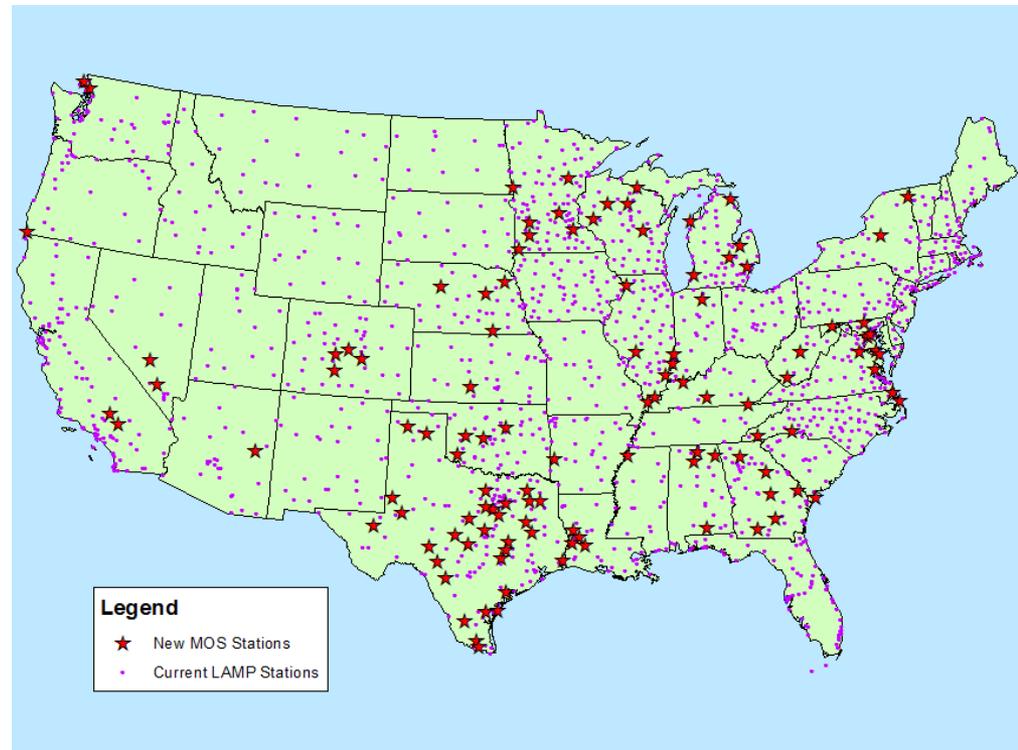


GLMP Temperature
Verified w/ 0-hr GLMP

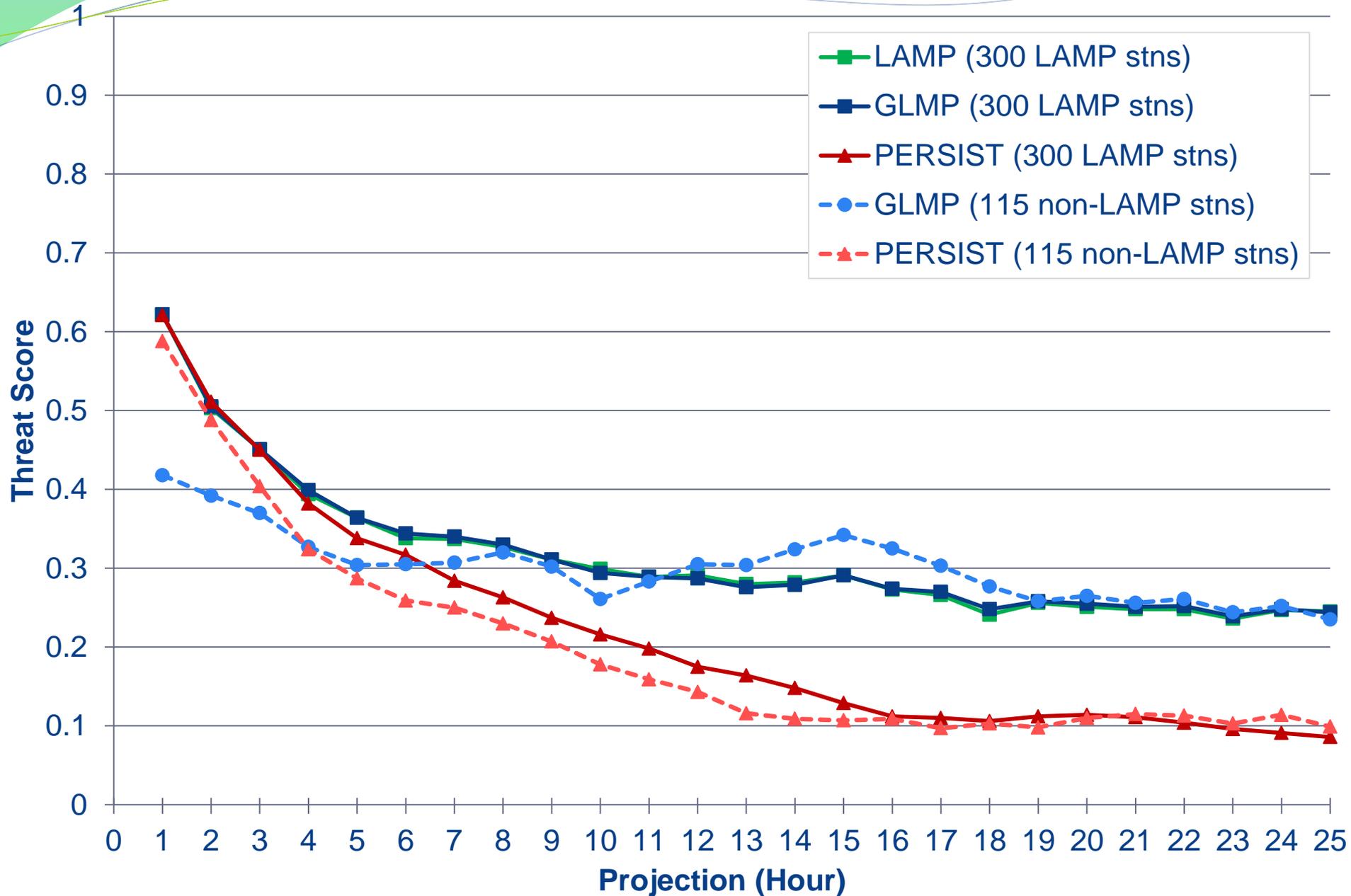
GLMP Temperature
Verified w/ RTMA

Ceiling Height and Visibility Station Verification

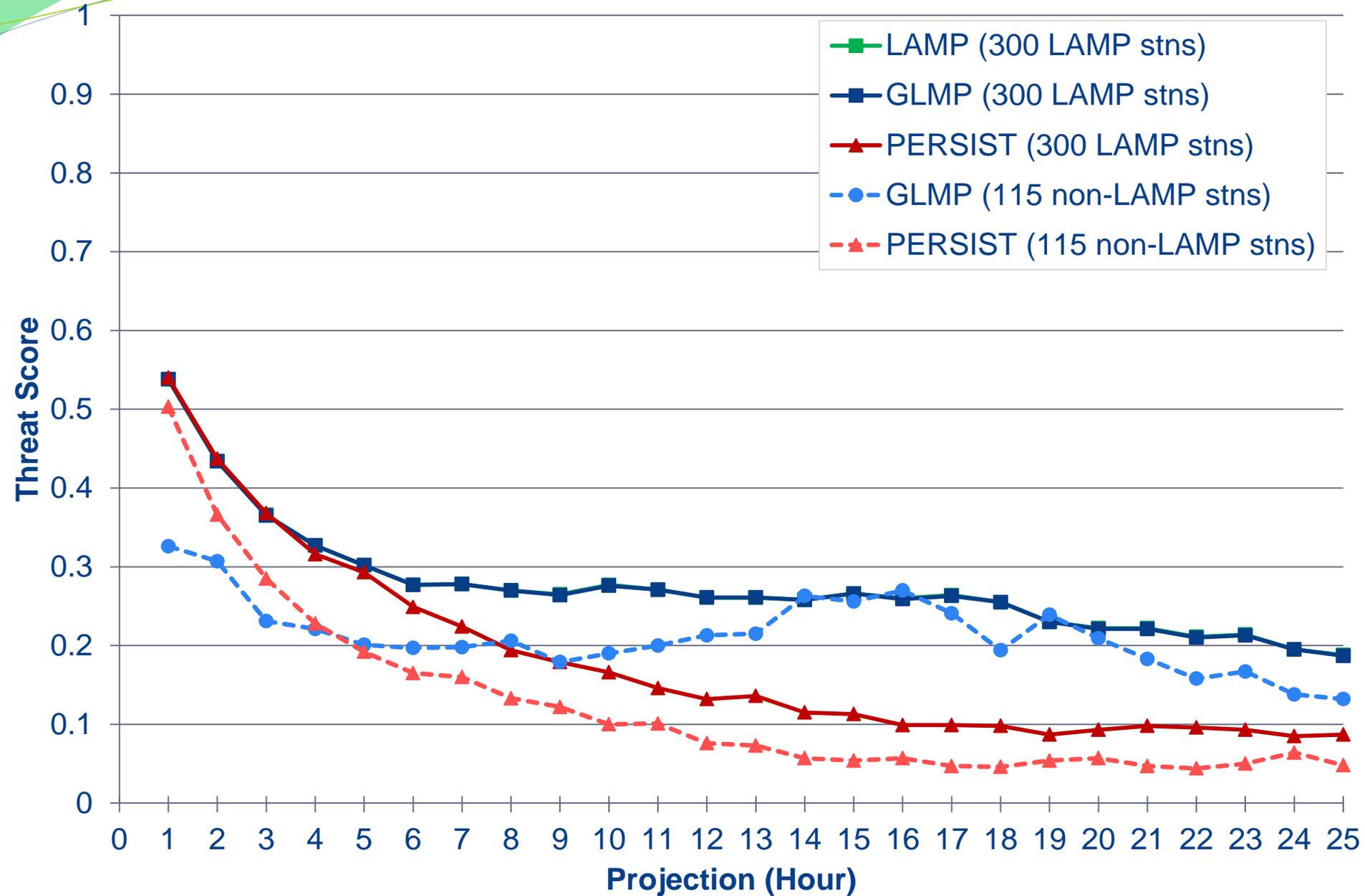
- No Gridded ceiling/visibility verifying observations other than from Gridded LAMP → verification done at stations only
- Two cycle times: 0600 (1800 UTC in paper)
- Verified for Nov-Dec, 2010
- Verifying at stations
 - At LAMP 300 stations
 - Purpose: to see if GLMP interpolated to the stations is as good as actual LAMP at the stations.
 - At 115 non-LAMP stations
 - 115 stations where LAMP station forecasts were not available, but obs were available
 - Mimics withheld data testing



Threat Scores 0600 UTC Ceiling Height < 1000 FT (At LAMP and NON-LAMP stations)



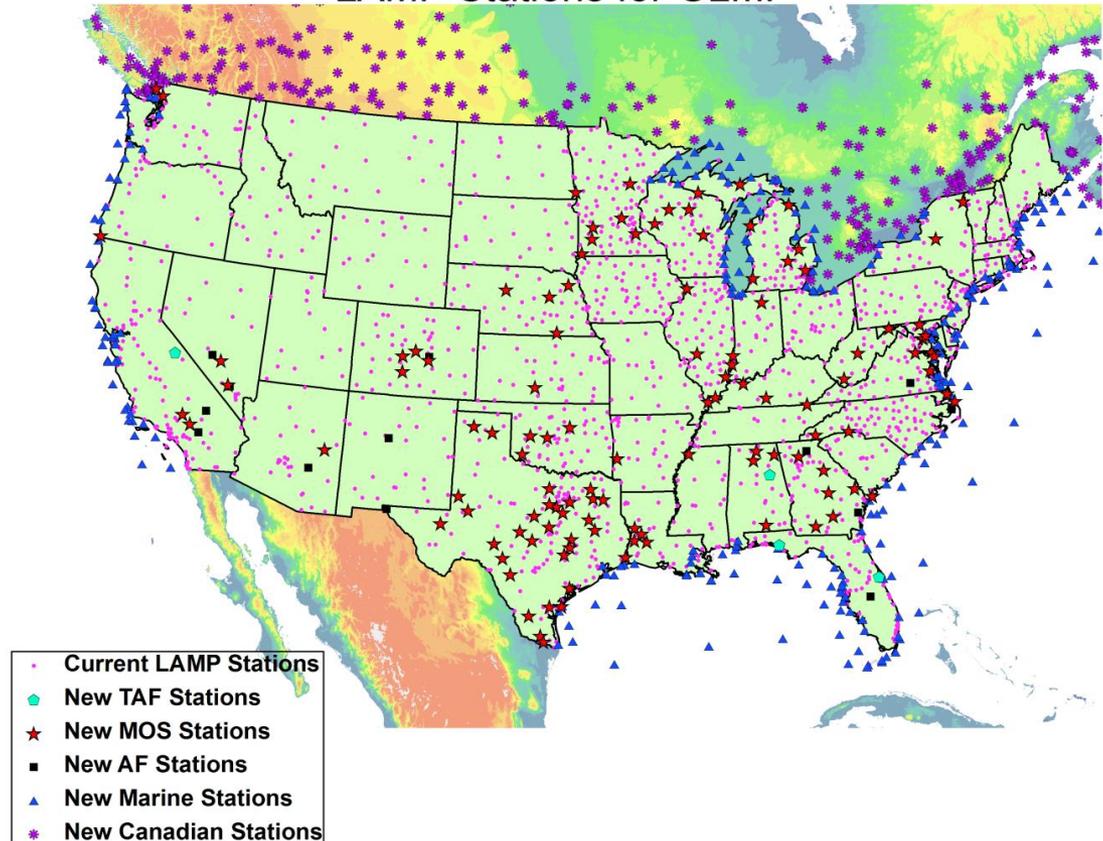
Threat Scores 0600 UTC Visibility < 3 MILES (At LAMP and NON-LAMP stations)



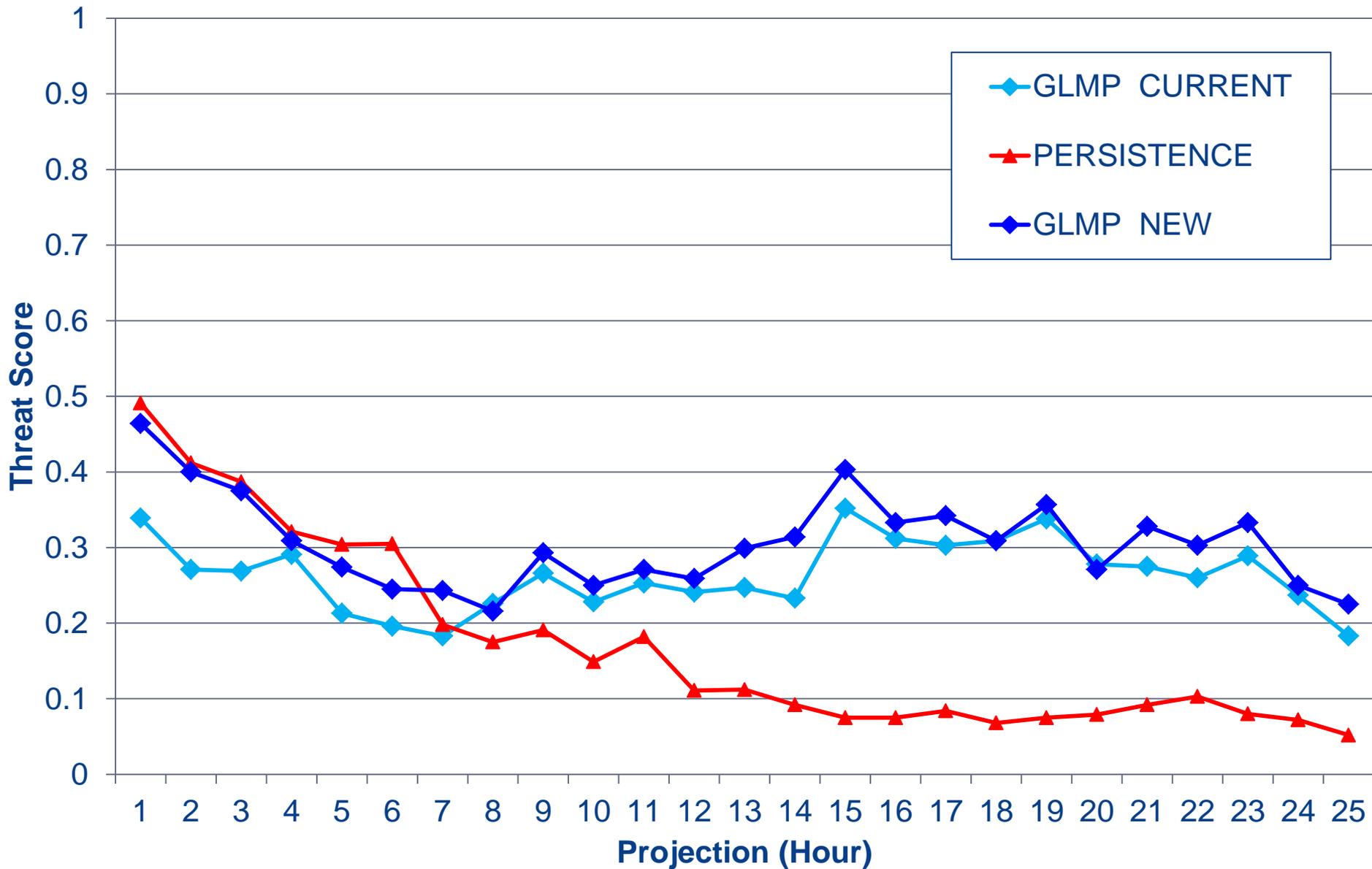
Future Improvements

- Persistence Effect for temperature and dewpoint:
 - Uses spatial detail seen in 0-hr GLMP observations (10,000-12,000 input points) as well as additional MOS input points to provide more spatial detail in GLMP forecast analyses
- Redeveloped ceiling height
- Extension to 30 hrs
- Adding Stations
 - 119 new MOS stns (116 in CONUS)
 - 306 Marine stns
 - 274 Canadian stns
 - 4 new TAF stns
 - 15 military stns (13 in CONUS)

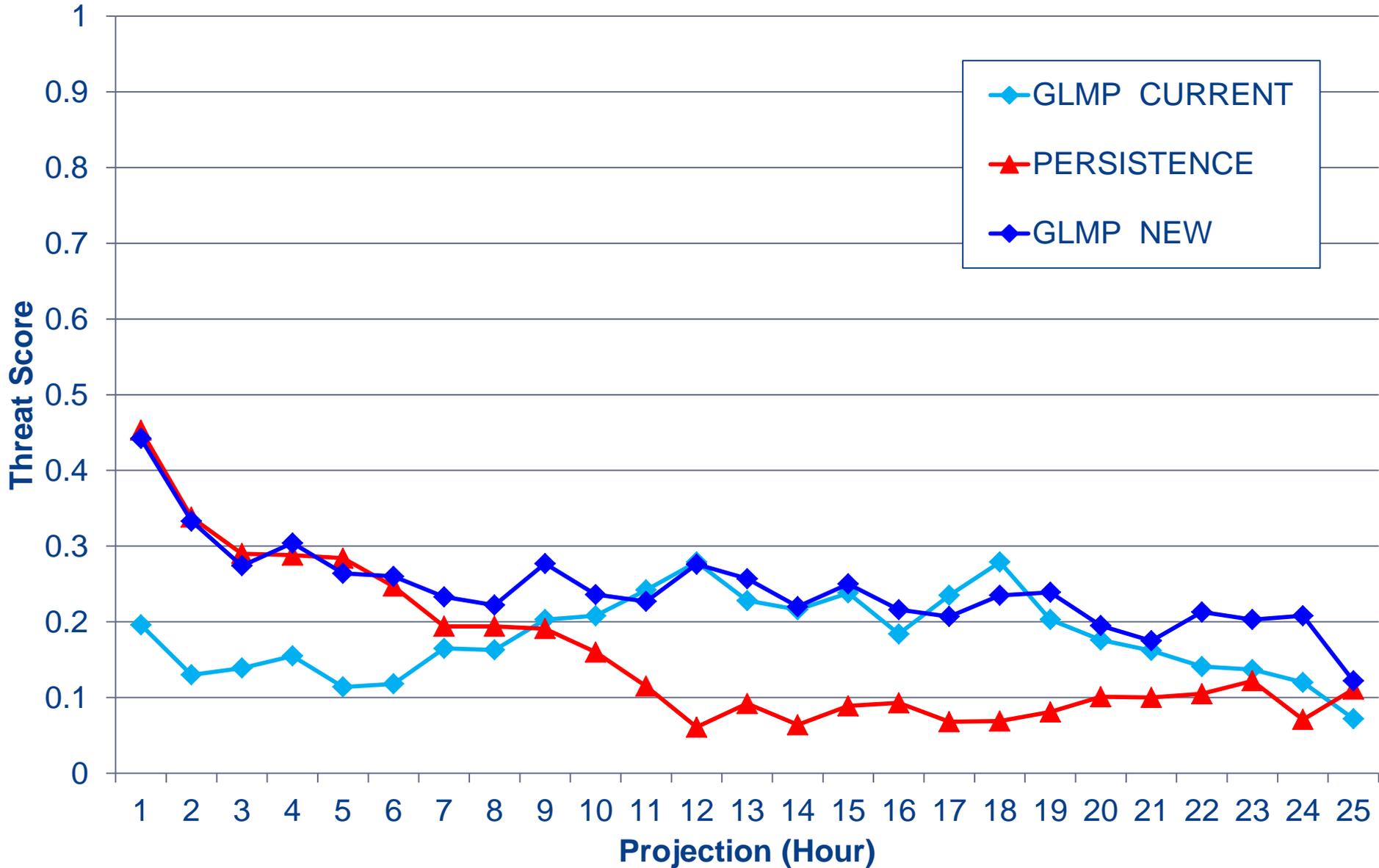
LAMP Stations for GLMP



0600 UTC GLMP Verification Ceiling Height < 1000 Feet (11 Canadian Stations)



0600 UTC GLMP Verification Visibility < 3 miles (11 Canadian Stations)



Summary

- GLMP running experimentally at NCEP for temperature, dewpoint, ceiling height, and visibility; GLMP useful in the creation of digital aviation products
- GLMP for temperature and dewpoint :
 - Overall, GLMP shows improvement over GMOS, as expected, independent of verifying data (GLMP gridded obs or RTMA)
 - By gridpoint, GMOS temperature is better than GLMP temperature in Western Region for some gridpoints, some projections
 - Potential solution developed and soon to be tested. Would be implemented in 2012.
- GLMP for ceiling height and visibility:
 - Overall, GLMP interpolated to LAMP stations shows no degradation compared to LAMP guidance at stations, as expected
 - GLMP interpolated to non-LAMP stations potentially worse than GLMP interpolated to LAMP stations, as expected
 - Improvements were seen in Canada after adding Canadian stations (to be implemented in future)
- LAMP Website:
 - <http://www.nws.noaa.gov/mdl/gfslamp/gfslamp.shtml>
- Contact:
 - Judy.Ghirardelli@noaa.gov