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

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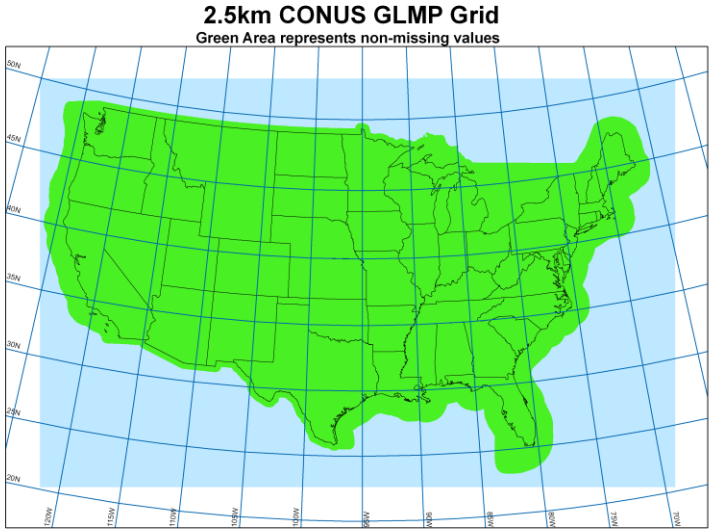
LAMP/Gridded LAMP (GLMP)

- 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

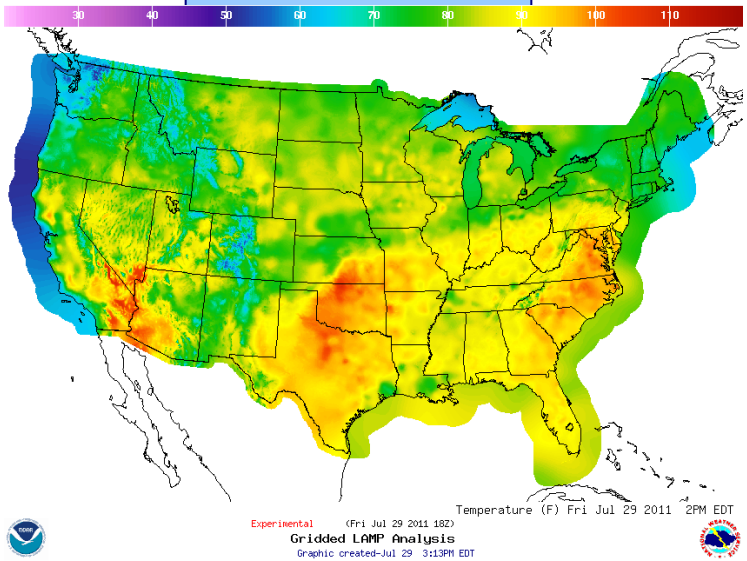
Gridded LAMP Details

- 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

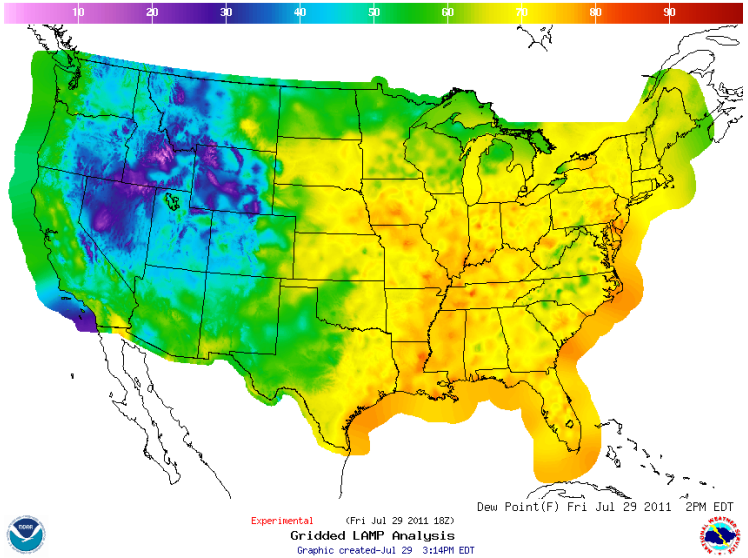
Technique: MDL Gridding Technique used in Gridded MOS, with modifications

Gridded LAMP: 0-25 hours

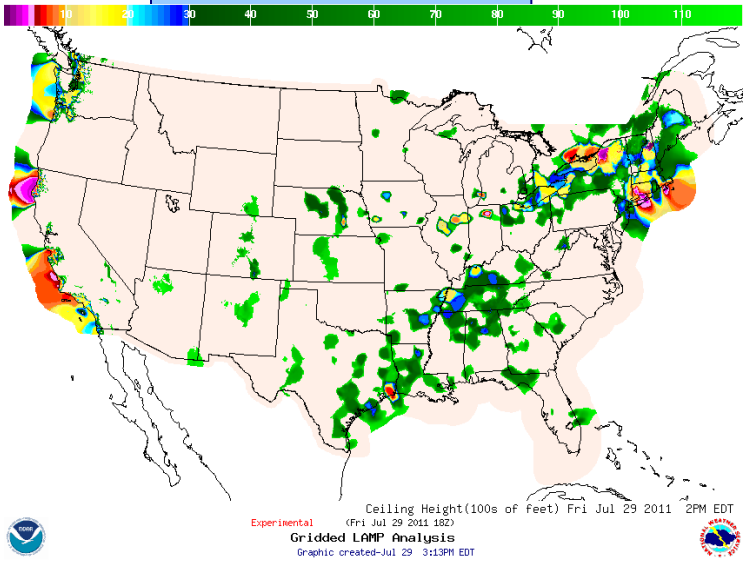
Temperature



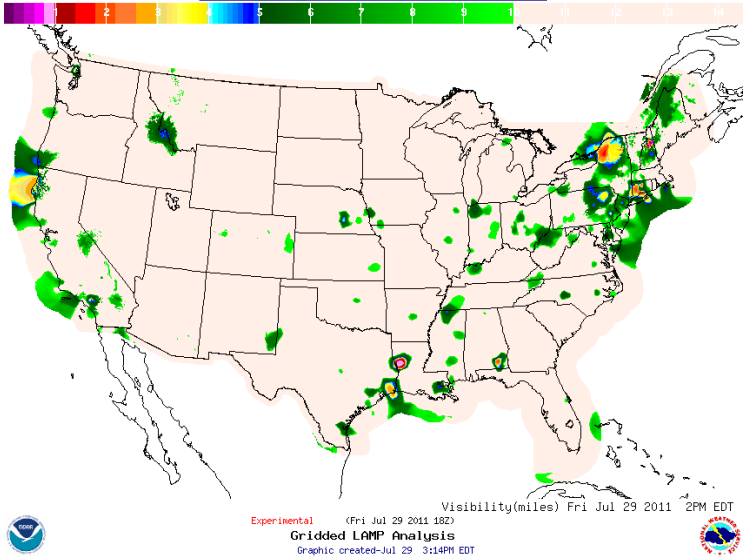
Dewpoint



Ceiling Height



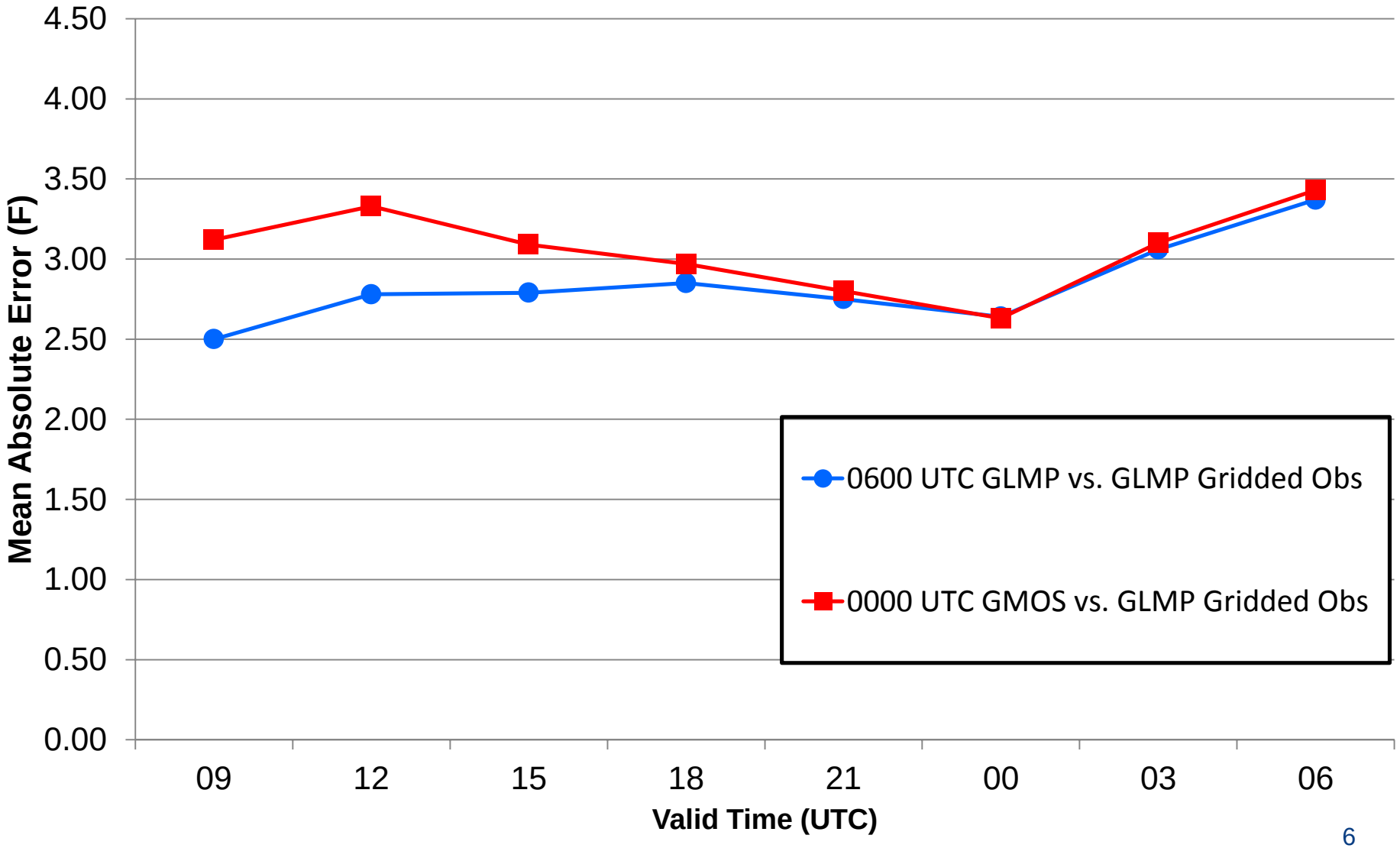
Visibility



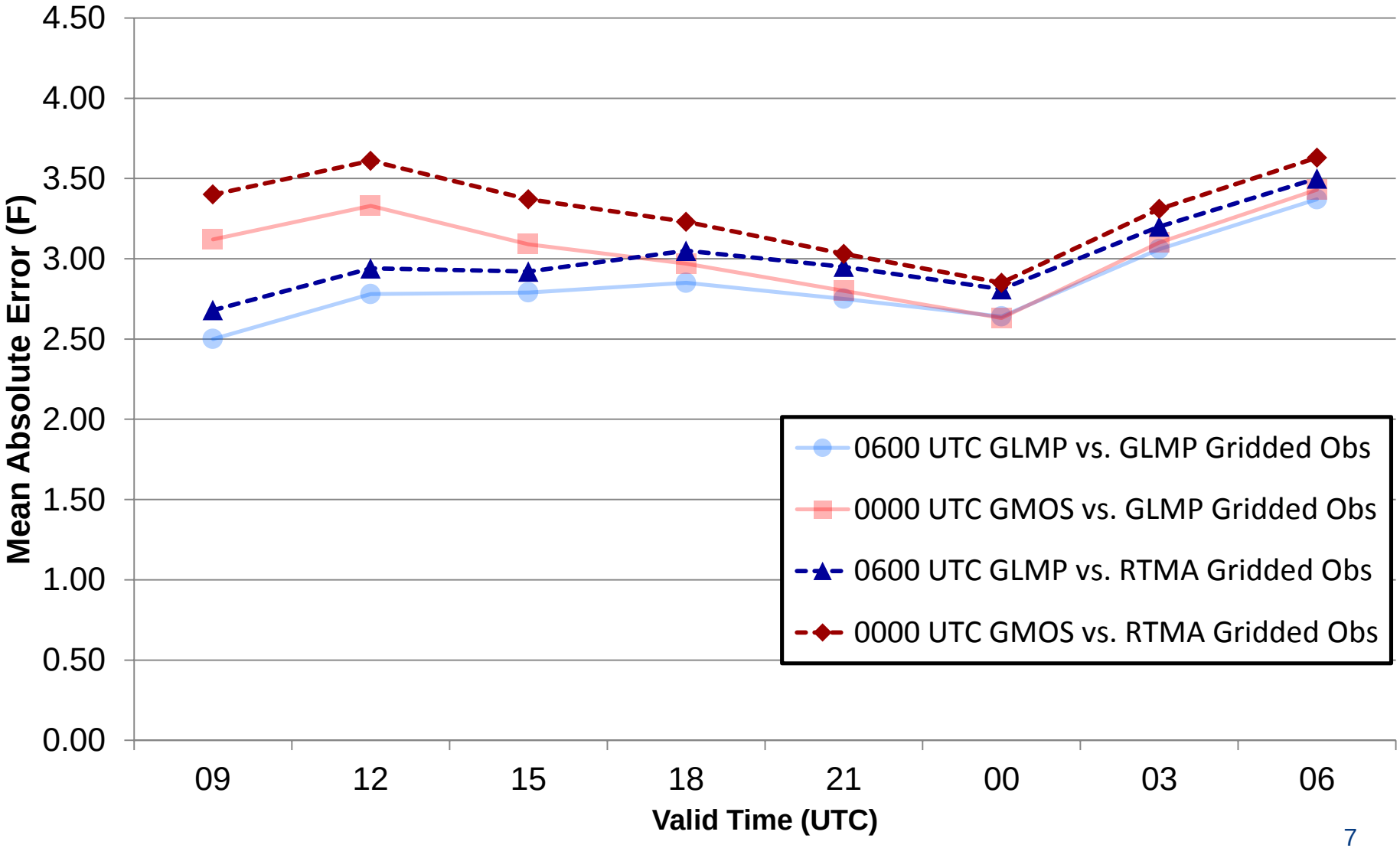
Temperature and Dewpoint Gridded Verification

- 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

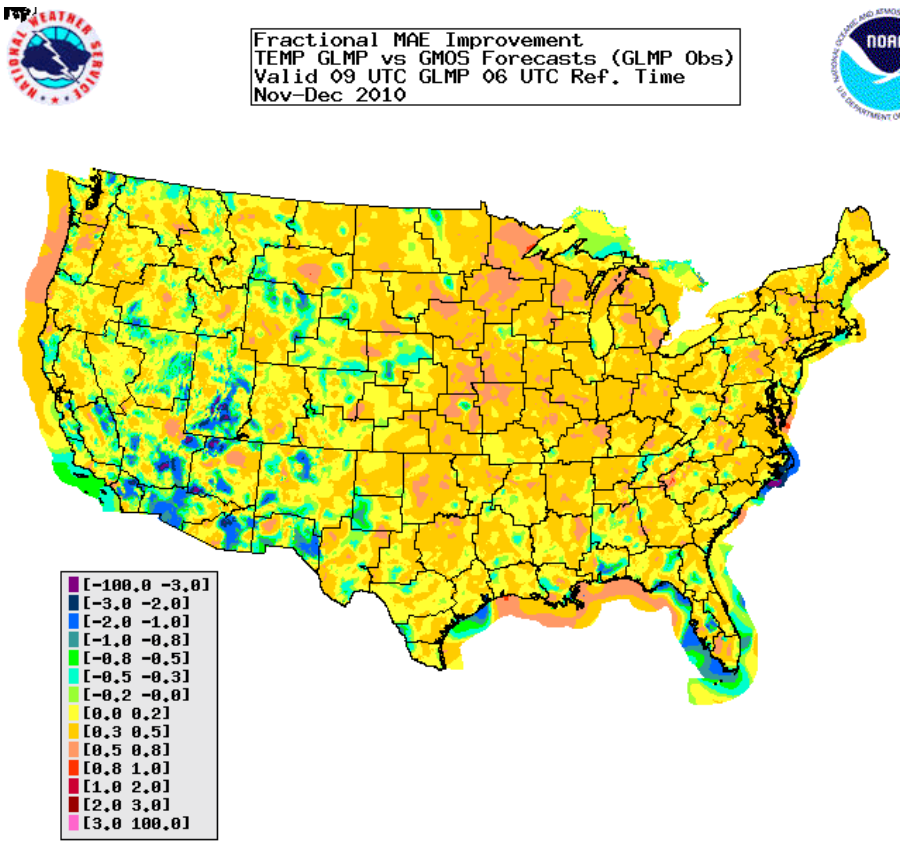


MAE over all gridpoints
0600 UTC Gridded LAMP Verification
Temperature - All Regions

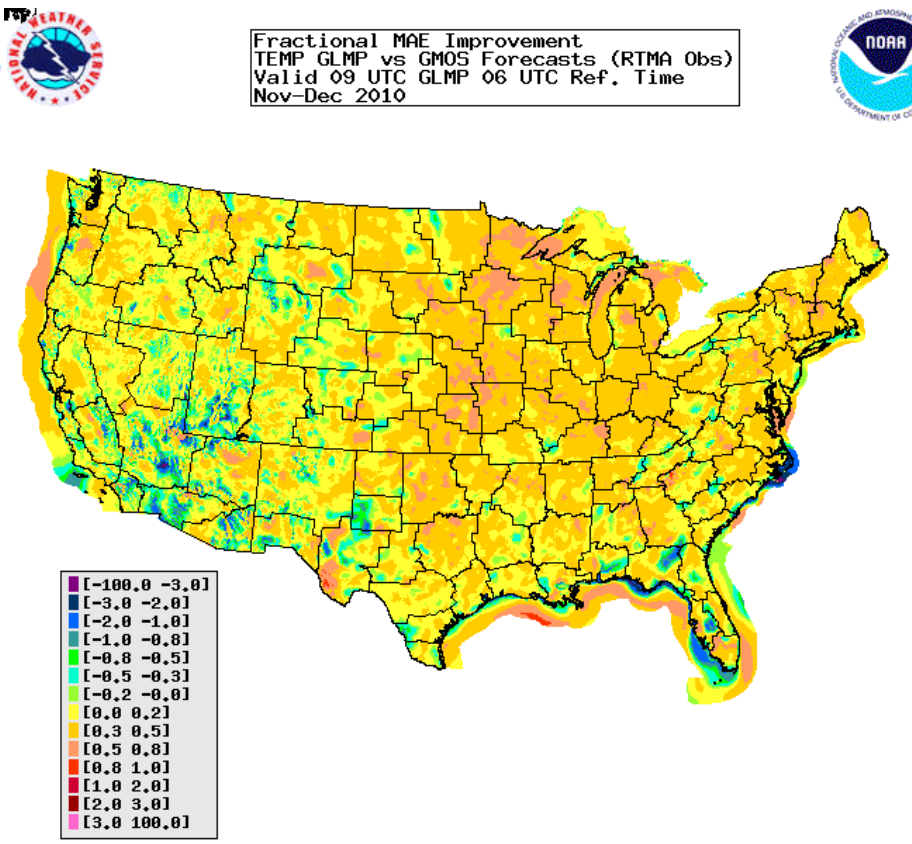


Fractional improvement in MAE of GLMP over GMOS at gridpoints

(3-hr forecast from 0600 UTC GLMP)



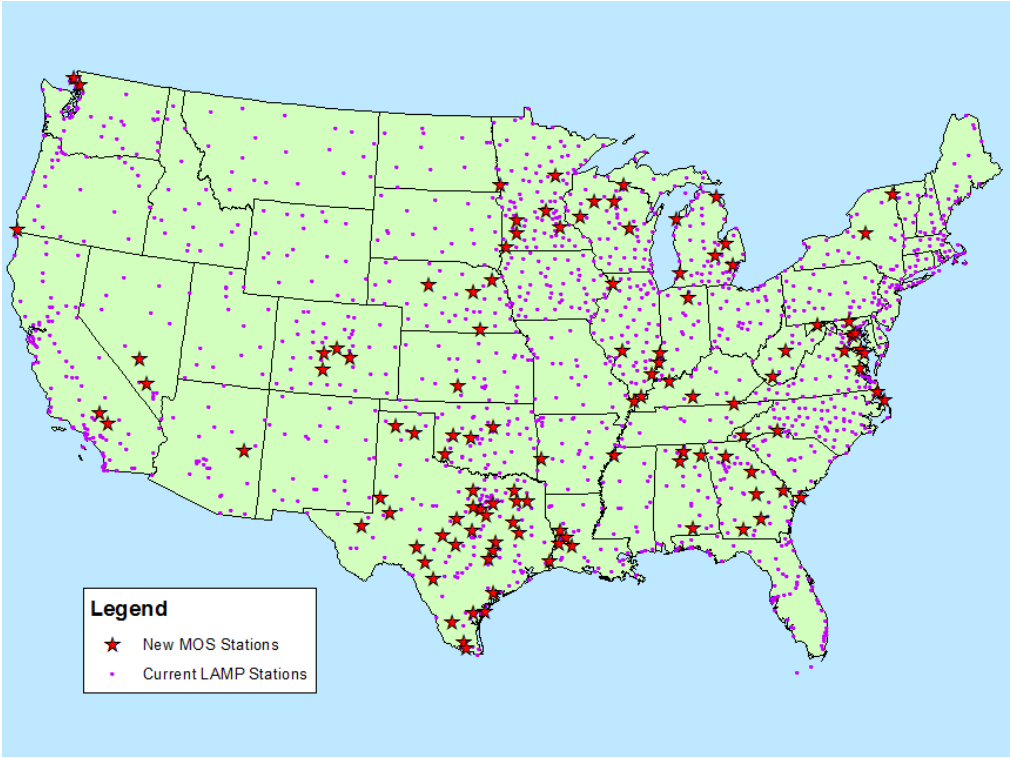
GLMP Temperature
Verified w/ 0-hr GLMP



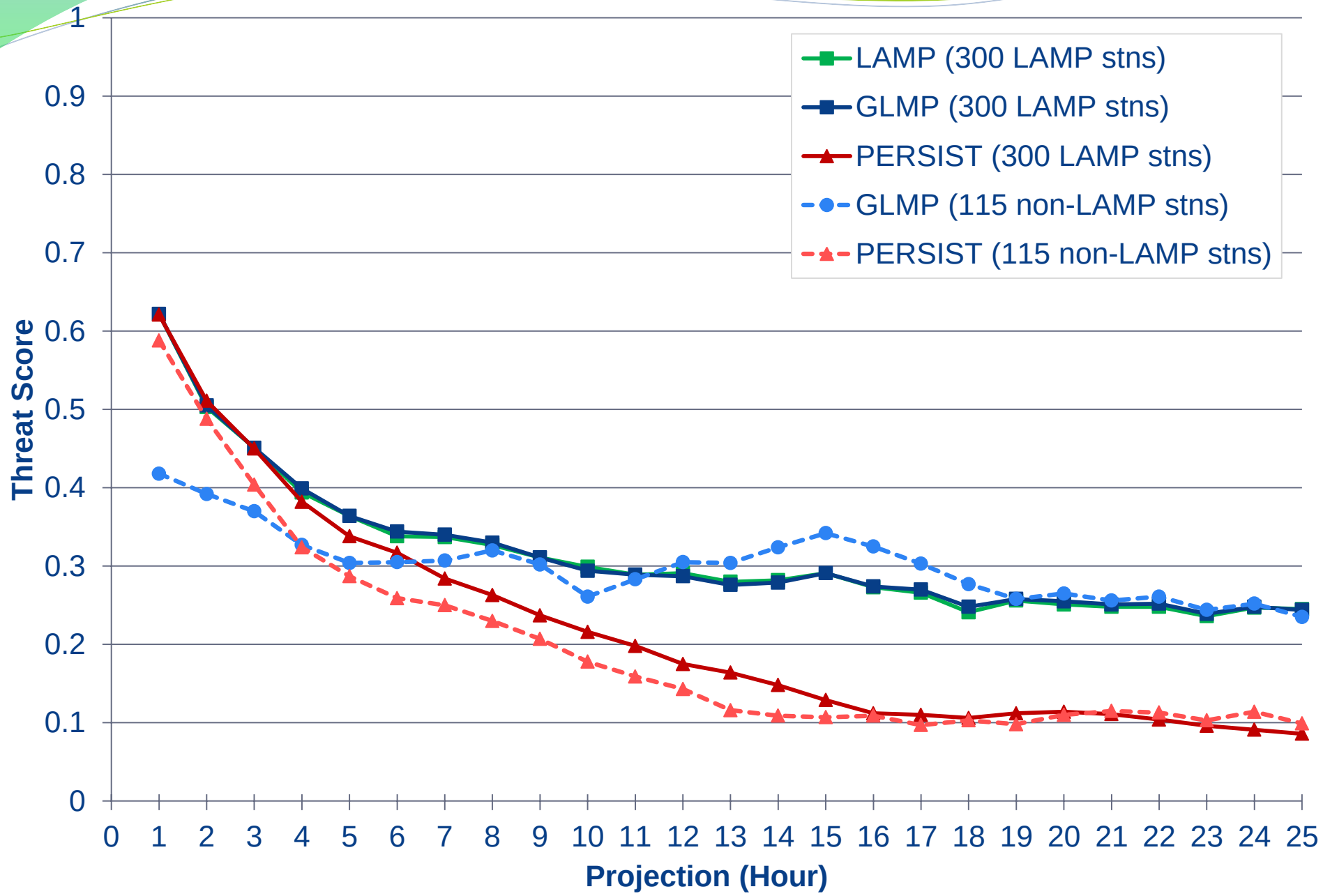
GLMP Temperature
Verified w/ RTMA

Ceiling Height and Visibility Station Verification

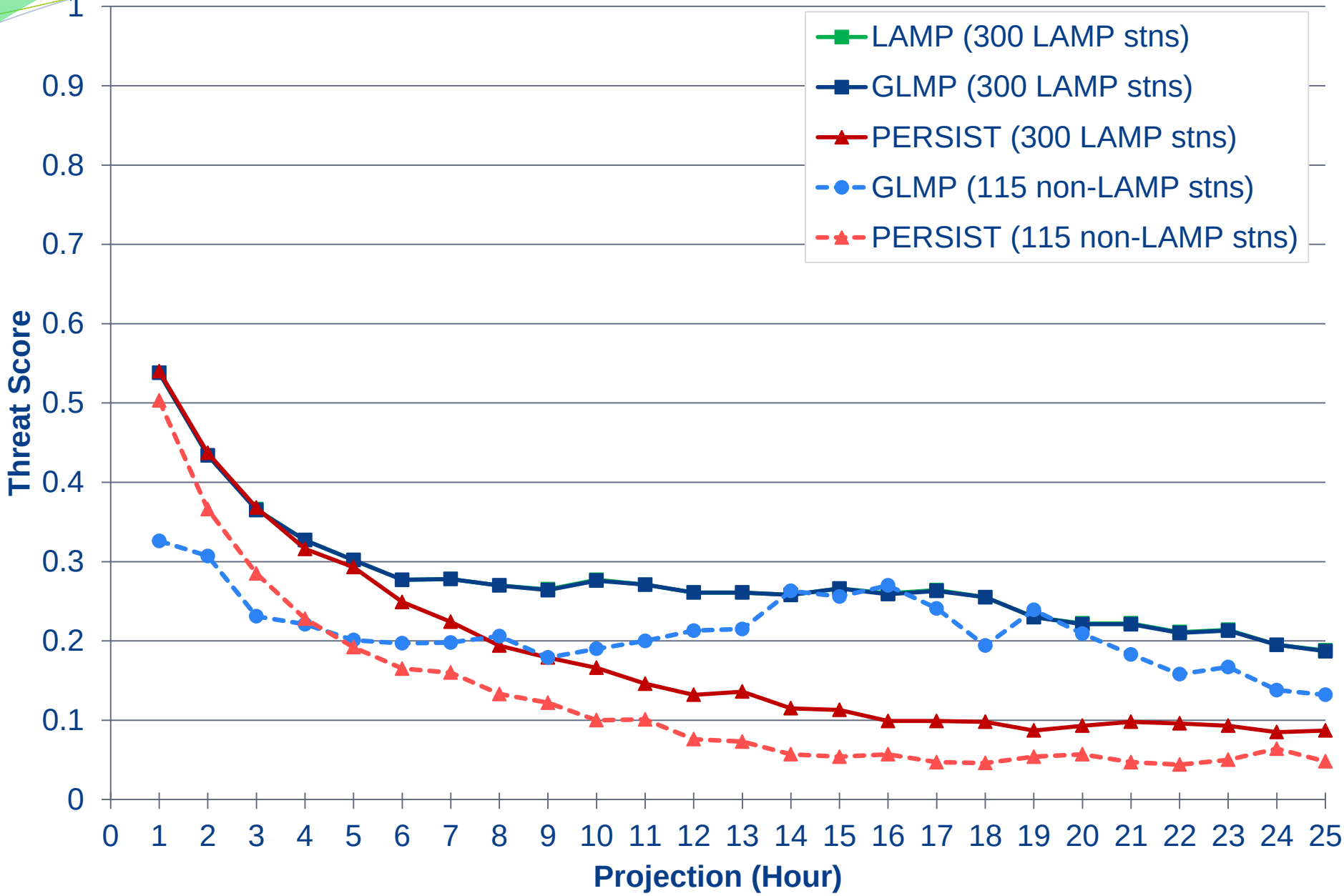
- No Gridded ceiling/visibility verifying observations other than from Gridded LAMP → verification done at stations only
- Two cycle times: 0600 (1800 UTC in paper)
- Verified for Nov-Dec, 2010
- Verifying at stations
  - At LAMP 300 stations
    - Purpose: to see if GLMP inter-polated to the stations 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 with-held data testing



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

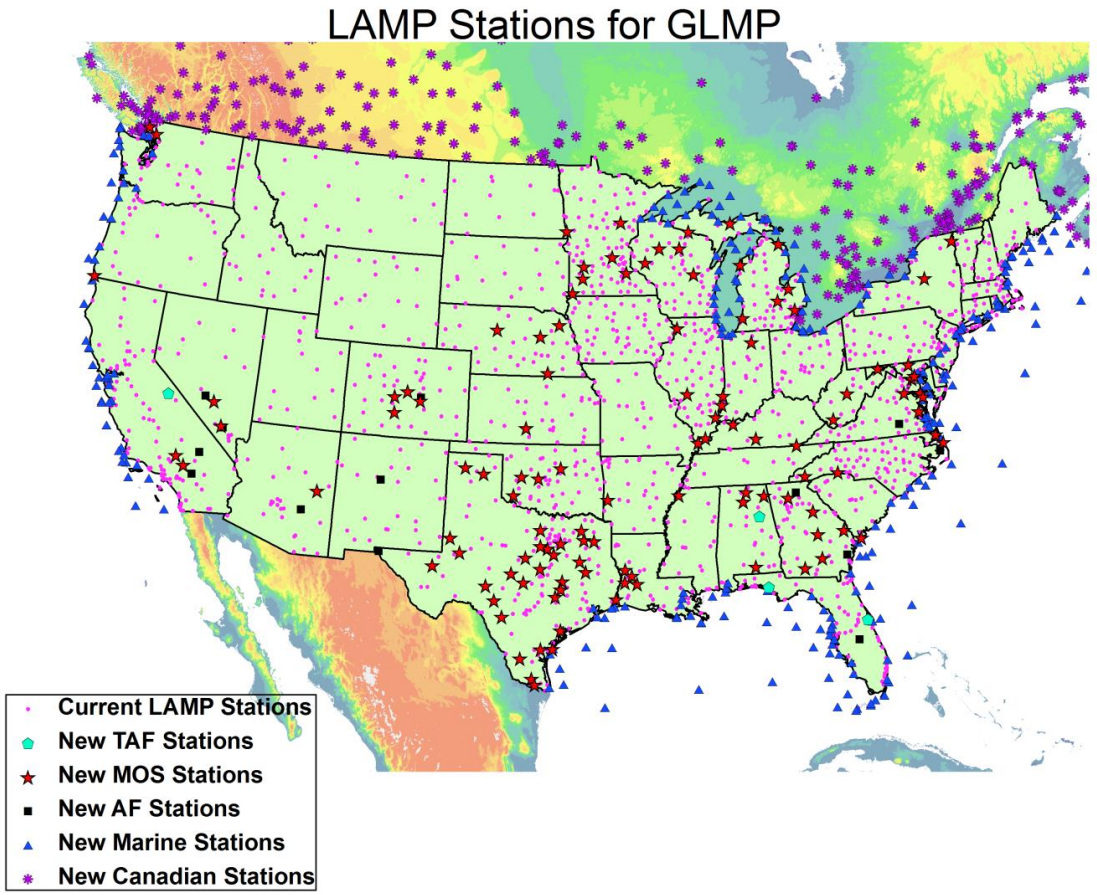


Threat Scores 0600 UTC Visibility < 3 MILES
(At LAMP and NON-LAMP stations)

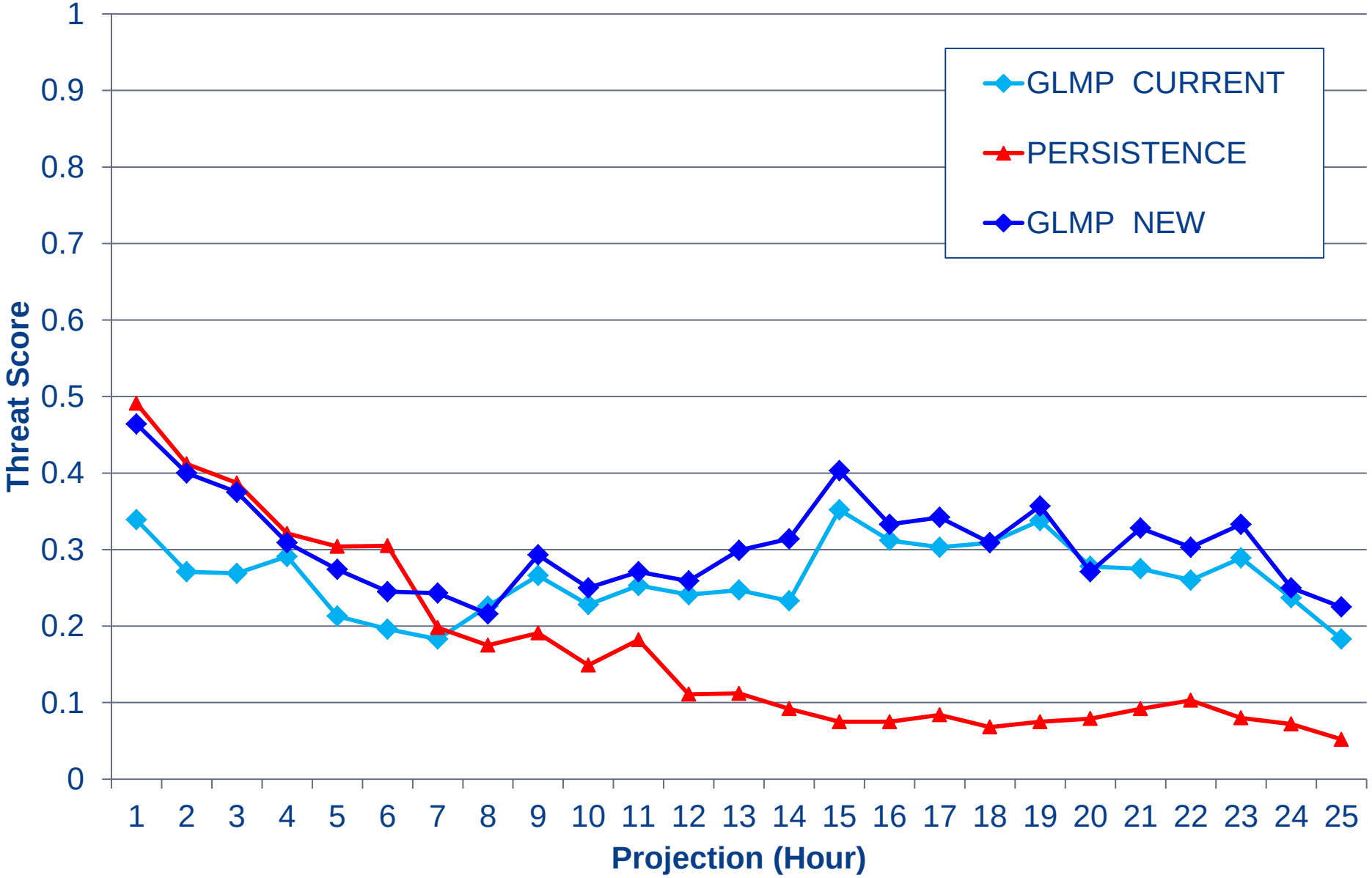


Future Improvements

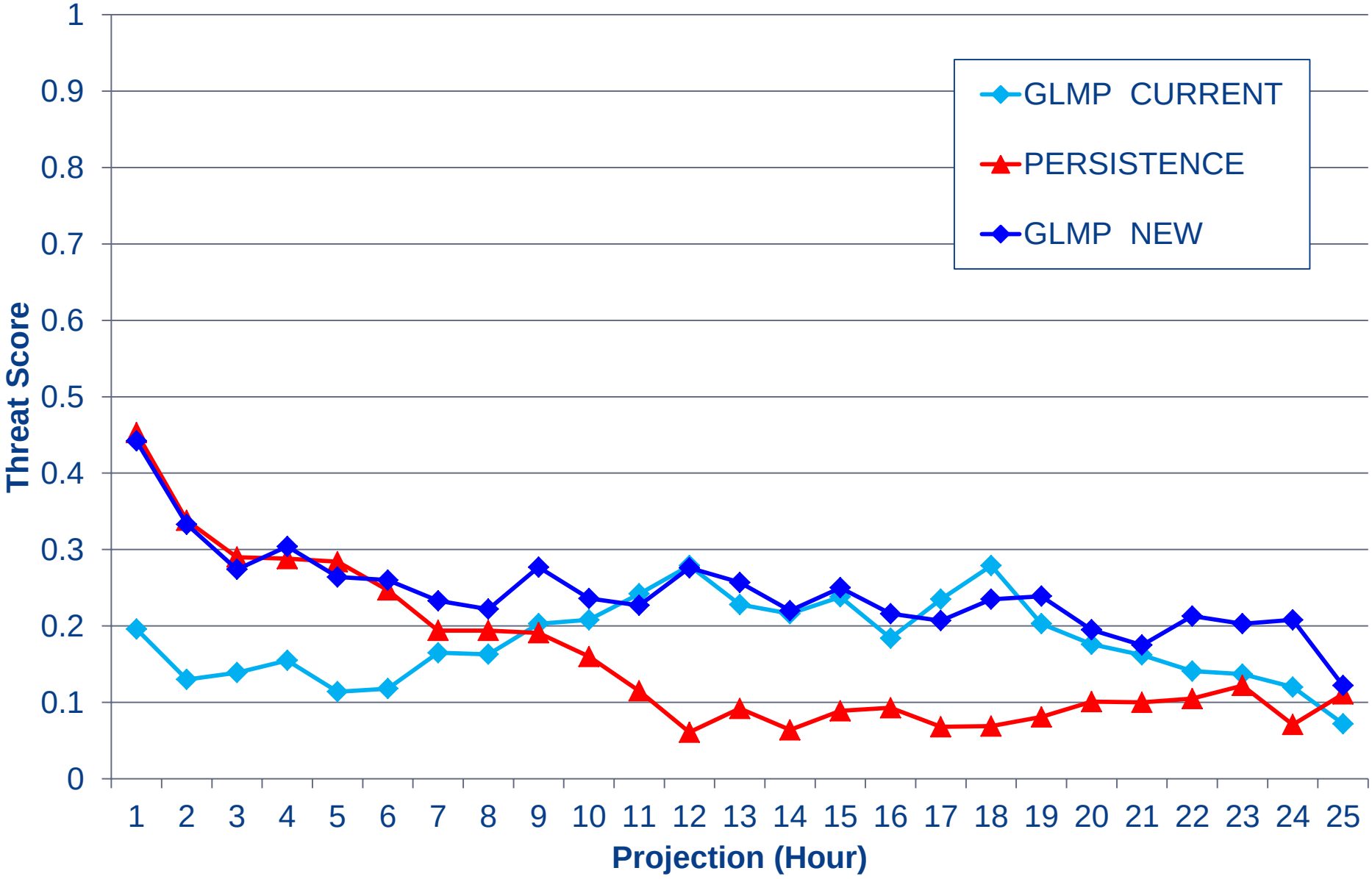
- Persistence Effect for temperature and dewpoint:
  - Uses spatial detail seen in 0-hr GLMP observations (10,000-12,000 input points) as well as additional MOS input points to provide more spatial detail in GLMP forecast analyses
- Redeveloped ceiling height
- Extension to 30 hrs
- Adding Stations
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



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