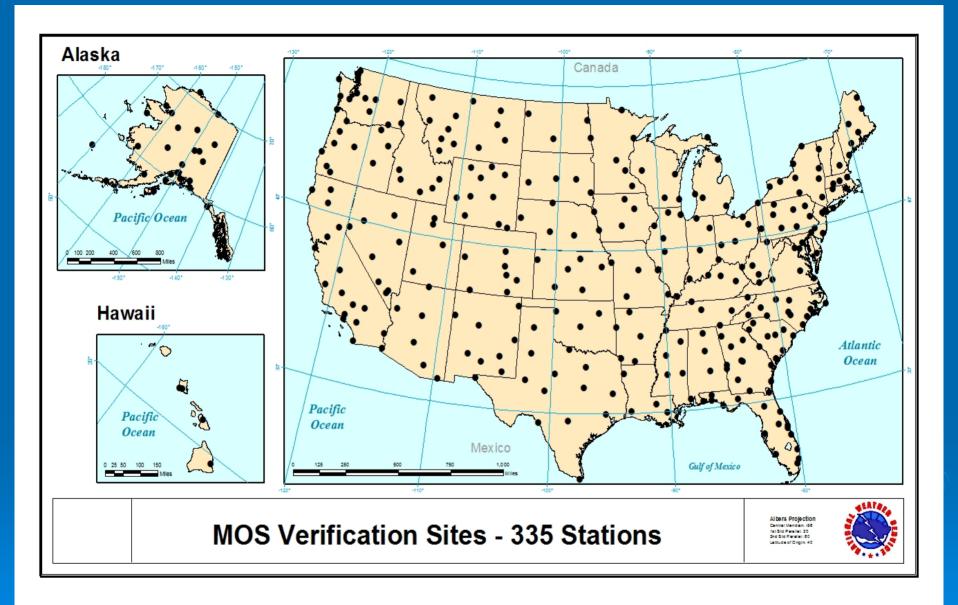
NMM-b Implementation Verification Results — Cool Season

Verifications Performed By:
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SCEP, Statistical Modeling Branch
MDL/OST/NWS

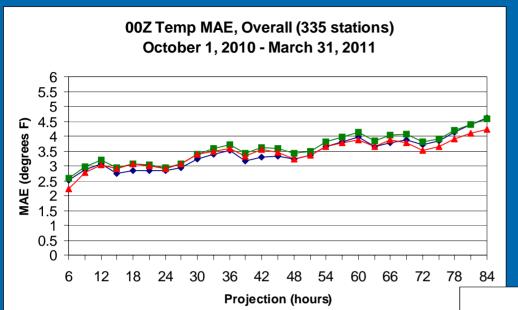
For more information, please contact:

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- •Mark Antolik mark.antolik@noaa.gov
- •Allison Monarski allison.monarski@noaa.gov

- Compared current NAM MOS with MOS on NMM-b parallel
- Cool Season Verification Period
 - Oct 1, 2010 March 31, 2011
- SMB standard 335 stations
- Parameters & Scores:
 - 2-m Temp, Dew Point, Max, Min MAE & Bias
 - Wind Speed MAE & HSS
 - Wind Direction MAE & CRF
 - 6, 12 hour Precip Brier Score
- 4 regions for each parameter
 - Overall (335), CONUS (300), Alaska (30), Hawaii/Puerto Rico (5 stations)
 - Temp & Dew Point CONUS also run regionally
 - 6 regions, 50 stations each region



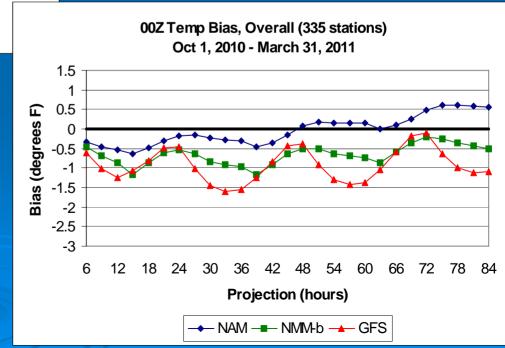
2-m Temperature



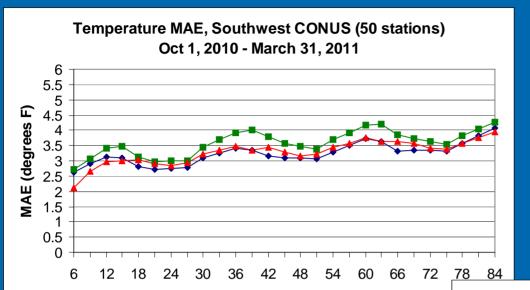
→ NAM → NMM-b → GFS

- NMM-b MAE slightly worse or similar to NAM
- Differences < 0.5 degrees

- Overall NMM-b cool bias across all regions, worse than NAM
- Differences < 1 degrees
- •GFS similar to, or worse than, NMM-b except in Southwest



2-m Temperature - Regional



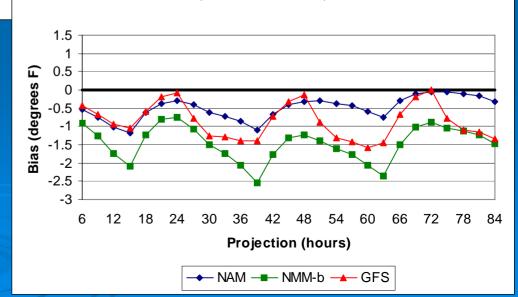
Projection (hours)

→ NAM → NMM-b → GFS

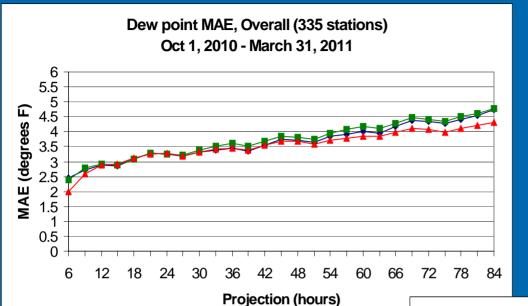
- NMM-b MAE similar to NAM in some regions, worse than NAM in others. Greatest difference in Southwest
- Differences between 0 and ~0.5

 Overall NMM-b cool bias across all regions, worse than NAM

 Differences as great as almost 2 degrees Temperature Bias, Southwest CONUS (50 stations)
Oct 1, 2010 - March 31, 2011



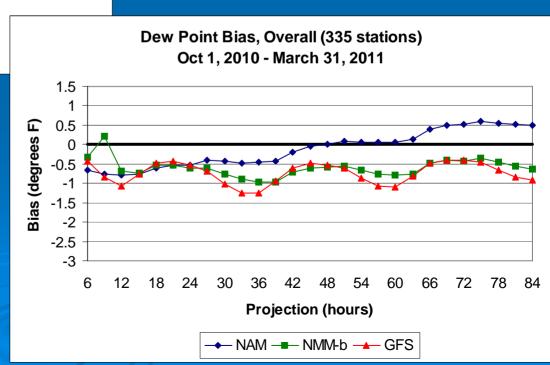
Dew Point



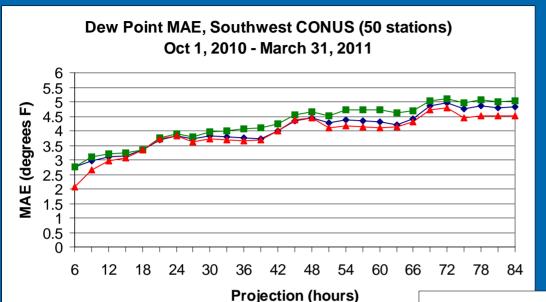
NAM → NMM-b → GFS

- NMM-b MAE close to NAM for all regions
- Differences < 0.5 degrees

- Overall dry NMM-b bias across all regions. Worse than NAM.
- Differences around 1 degree, especially at later projections
- •GFS similar to, or worse than, NMM-b except in Southwest



Dew Point - Regional

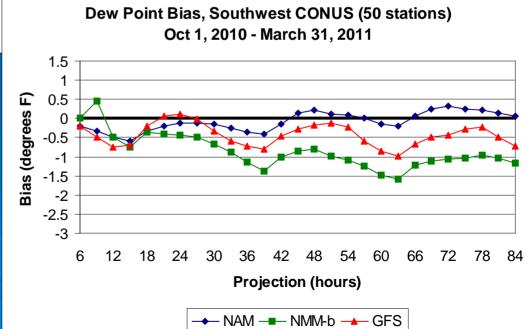


NAM → NMM-b → GFS

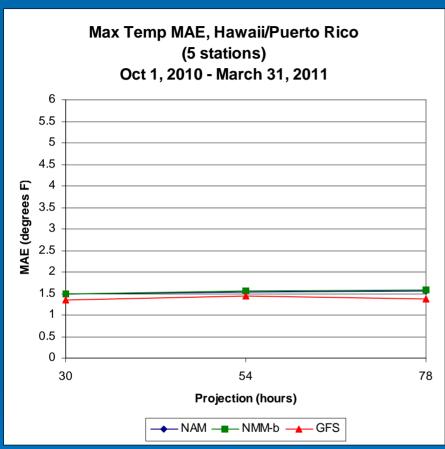
- NMM-b MAE similar to, or slightly worse than, NAM for all regions
- Differences < 0.5 degrees



Differences as great as 1.5 degrees

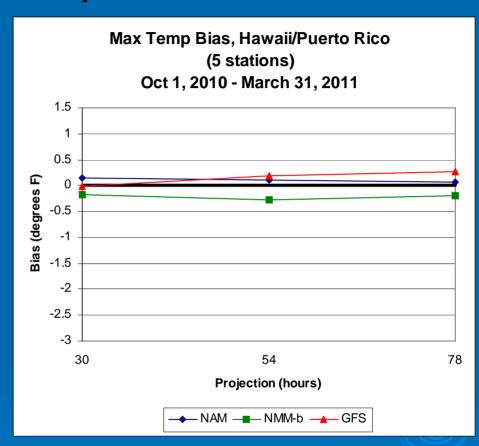


Maximum Temperature



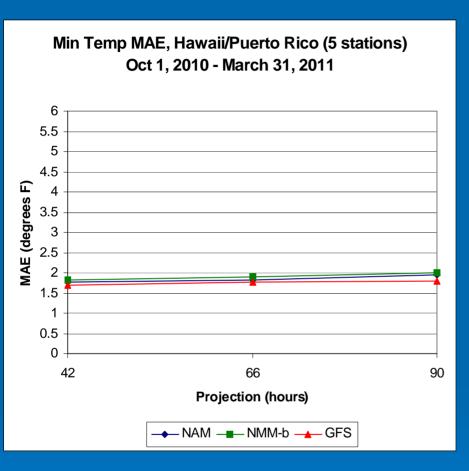


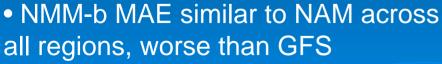
- •differences < 0.5 degrees
- •NMM-b MAE similar to NAM for Alaska & Hawaii

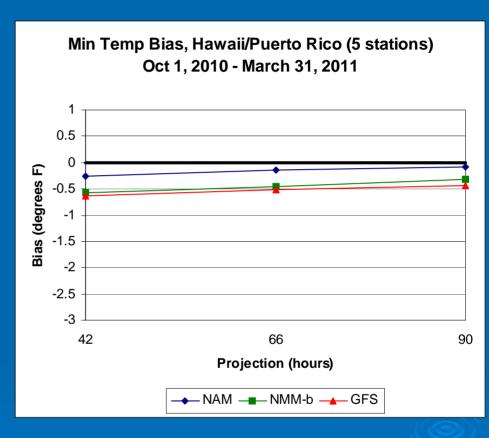


 NMM-b cool bias across all regions with NMM-b worse than NAM by < 1 degree.

Minimum Temperature

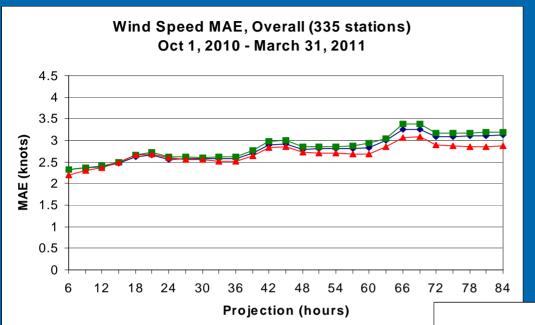






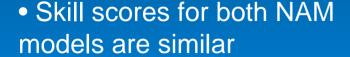
- NMM-b cool bias in all regions
- Differences between NAM and NMM-b around 1 degree.

Wind Speed

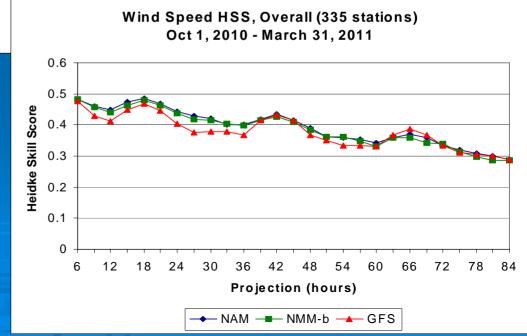


- NAM --- NMM-B --- GFS

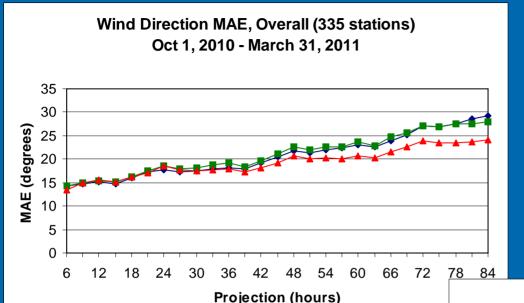
- Differences between NMM-b and NAM MAE are minimal
- GFS is similar, or slightly better than NAM



 Skill for GFS is a bit worse than NAM



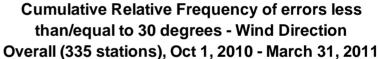
Wind Direction

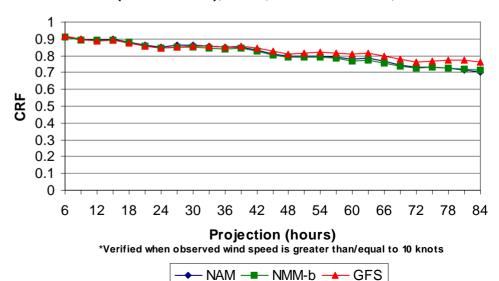


→ NAM → NMM-b → GFS

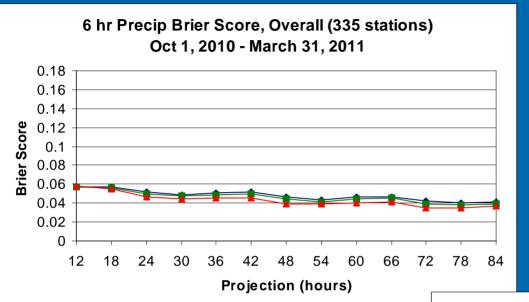
- NMM-b MAE very similar to NAM
- GFS slightly better than NAM models





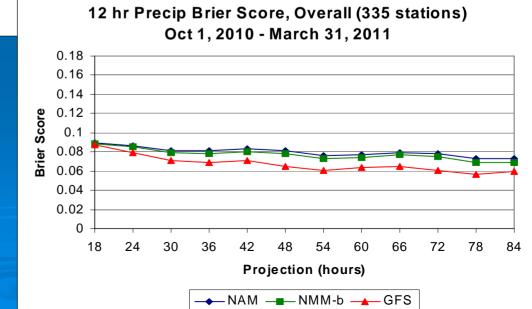


6 & 12 hour Precipitation



→ NAM → NMM-b → GFS

- Brier Scores are similar
 Overall and CONUS, NMM-b
 slightly lower than NAM for
 Alaska & Hawaii
- GFS Brier Score is lower than NAM



Cool Season Overall Summary

- Cool season changes associated with the NMM-b implementation are very similar to warm season, and in some cases, slightly exaggerated
 - Potential for a possible temperature redevelopment?
- Bias wise, GFS bias is worse than NMM-b with a stronger diurnal cycle
- NAM performance advantage over GFS seems to be lost with the implementation