Development of Operational Verification Capability for the NOAA Artificial Intelligence Global Forecast System (AIGFS) v1.0

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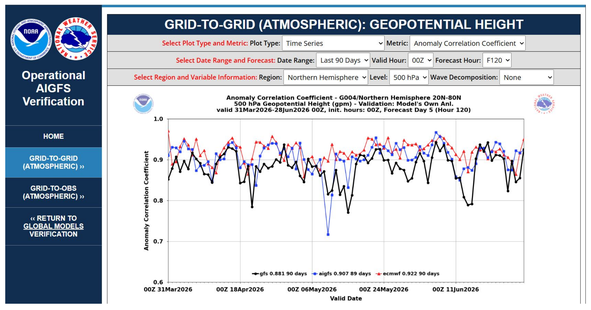
AIGFS

- Launched in December 2025, the NOAA Artificial Intelligence Global Forecast System (AIGFS) v1.0 advances operational forecasting by integrating Google DeepMind's GraphCast framework, fine-tuned with NOAA's Global Data Assimilation System (GDAS) data.
- The system is designed to complement traditional Numerical Weather Prediction (NWP) model GFS by delivering skillful forecasts with reduced latency and lower computational costs.
- Because AI models show distinct error characteristics and variable-dependent performance, standardized verification is critical to building operational trust and facilitating full adoption.

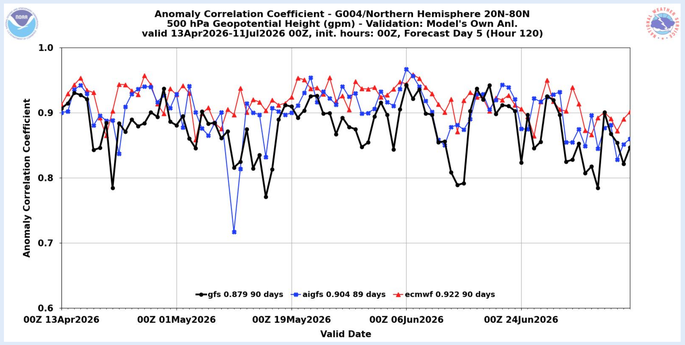
Verification and Evaluation

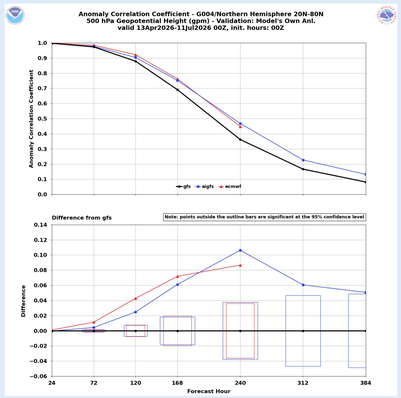
- Evaluated via the NOAA/NWS OMD Evaluation and Verification System (EVS v2.0) using the enhanced Model Evaluation Toolkit (METplus) (Levit et al., 2024).
- Operational EVS verification for the AIGFS was successfully implemented on June 16, 2026.
- Near real-time intercomparison results are hosted online for public access (*https://www.emc.ncep.noaa.gov/users/verification/global/aigfs/prod/*)



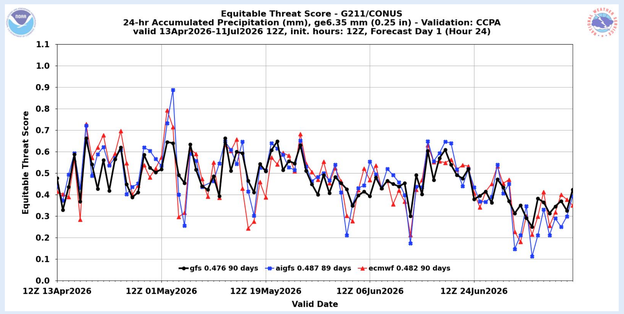
EVS Provides Complex Evaluation Metrics and Diagnose Plots

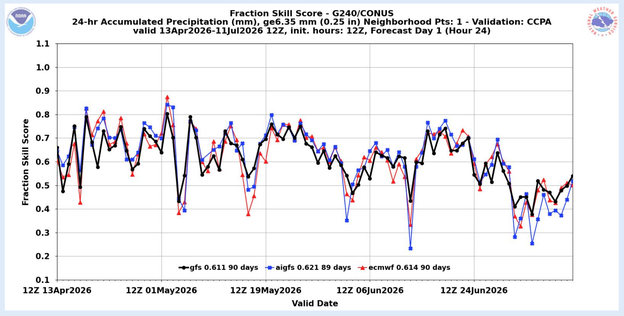
Grid-to-Grid Pressure Level Plots

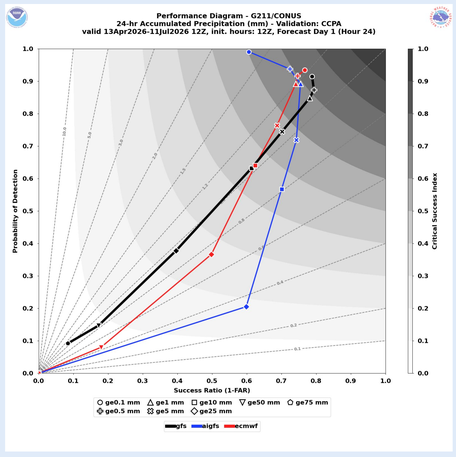




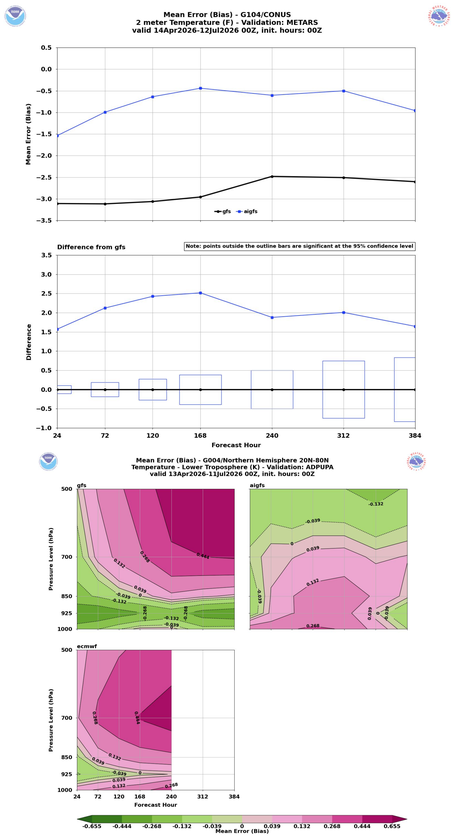
Precipitation Score Plots and Performance Diagram







Grid-to-Obs Plots



Conclusions and Future Work

- Results from EVS v2.0 indicate that AIGFSv1.0 achieved a statistically significant improvement relative to GFSv16 in anomaly correlation coefficient (ACC) for geopotential height.
- In addition, AIGFSv1.0 reduced 2-m temperature bias over the Continental United States (CONUS) .
- Future work includes collaboration with the Developmental Testbed Center (DTC) to develop new verification metrics tailored to AI model evaluation.

ACKNOWLEDGEMENTS:

REFERENCES:

Levit, J. J. et al. 2025: An Overview of the Environmental Modeling Center Verification System (EVS), 105th annual AMS Meeting, Orleans, LA.

Levit, J. J. et al. 2024: The Environmental Modeling Center Verification System (EVS): Real-time verification of Unified Forecast System (UFS) models, 104th Annual AMS Meeting, Baltimore, MD.

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