

## Evaluations of deterministic and ensemble regional MPAS configurations for severe weather forecasting during the 2024 NOAA/Hazardous Weather Testbed Spring Forecasting Experiment

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For the second consecutive year, regional configurations of the Model for Prediction Across Scales (MPAS) are tested for severe weather forecasting applications during the 2024 NOAA Hazardous Weather Testbed Spring Forecasting Experiment (SFE 2024), which runs 29 April – 31 May 2024. These include three CONUS-domain, 3-km grid-spacing configurations developed at the National Severe Storms Laboratory (NSSL): (1) MPAS HT, (2) MPAS HN, and (3) MPAS RT. In these names, the last two letters denote the initialization dataset and microphysics scheme, respectively. “HT” is HRRR/Thompson, “HN” is HRRR/NSSL, and “RT” is RRFS/Thompson. All three of these configurations use the MYNN boundary layer parameterization, RUC land surface model, and RRTMG short and long wave radiation. The configurations are initialized at 0000 and 1200 UTC with HRRR initializations running 48 h and RRFS ones 60 h. Several updates to the model physics have been made since the initial testing was conducted during SFE 2023. Additionally, a version of the RRFS Ensemble Forecast System (REFS) in which the Finite Volume Cubed Sphere (FV3) members are replaced by MPAS members will be tested. The MPAS members in this experimental REFS configuration include the MPAS RT members run at NSSL, as well as five members run at the Global Systems Laboratory (GSL) that are initialized from perturbed REFS analyses. Daily model evaluations will assess performance characteristics alongside the HRRR, HREF, RRFS, REFS, and other experimental systems. Ultimately, these tests are helping advance the use of MPAS within NSSL’s Warn-on-Forecast System (WoFS), and exploring potential use within the framework of NOAA’s Unified Forecast System (UFS) initiative. This talk will present preliminary results from these evaluations and highlight notable cases of interest.