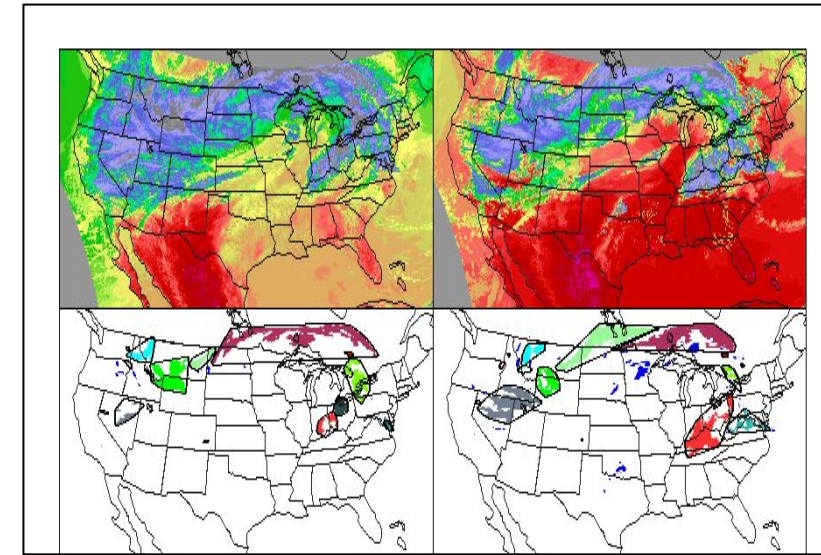


Advancing Forecast Verification Efforts for the UFS using Spatial Verification Methods

Jason Otkin (PI) and Sarah Griffin (UW-Madison/CIMSS), Tara Jensen and Eric Gilleland (NCAR), Patrick Skinner (OU), with contributions from Sharon Nebuda, Tim Supinie, Fanyou Kong, and Ming Xue

- FY 2018 NOAA JTTI project
- Main achievements:
 - Used GOES-16 ABI infrared brightness temperatures and WSR-88D radar reflectivity observations to assess the accuracy of cloud objects in high-resolution FV3-LAM forecasts employing different parameterization schemes
 - Used spatial verification methods, including MODE and MED
 - Results showed that Thompson microphysics scheme produced more accurate cloud fields than the NSSL scheme, and that the RUC land surface model model performed better than the GFS land surface model
 - Published results from this study in *J. Geophys. Res.* (Griffin et al., in press)
 - Developed a use-case demonstrating how to use the MODE verification method and satellite observations to assess the accuracy of upper-level cloud objects
 - Included in METplus version 4.0 and installed on Hera, WCOSS, and Jet
- Current readiness level is ARL-7
- Next steps:
 - Continue verification efforts using satellite and radar observations
 - Develop and deliver new use cases showing how to use MED and include it in future versions of METplus



Example of Object Identification using the Method for Object-based Diagnostic Evaluation (MODE)

Development of Alternative Verification Scorecards

Jason Otkin (PI) (UW-Madison/CIMSS) and Tara Jensen (NCAR), with contributions from Coda Philips, Will Lewis, and the EMC Model Evaluation Group (MEG)

- Initially supported with JTTI EPIC funding (via a subcontract from NCAR), most recently through the UFS R2O project
- Main achievements:
 - Have begun exploring the merits of alternative verification scorecard methods for the SRW application, such as waffleplots and barcodes (example shown below) using synthetic verification datasets, and real datasets when possible
 - We are designing and evaluating the alternative methods using results from the UFS Metrics Workshop held in February
 - There are over 10,000 statistics requested/required to evaluate the SRW application, so it is critical that alternative methods are designed to condense this information into something that is more usable and tractable
- Current readiness level is ARL-4
- Next steps:
 - Finalize prototype alternative designs and solicit feedback for the SRW application; repeat for the MRW application

