

RECENT ENHANCEMENTS TO THE MODEL EVALUATION TOOLS (MET)



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Thank You

Support for MET is provided by
the Developmental Testbed Center (DTC),
the Air Force Weather Agency (AFWA),
and
the Hurricane Forecast Improvement Project (HFIP).



What's is it?

- Free and supported model verification software.
 - ▣ Traditional statistics – continuous and categorical
 - ▣ Confidence intervals
 - ▣ Statistics for probability forecasts
 - ▣ Ensemble preprocessor and statistics
 - ▣ Cloud verification capability
 - ▣ Neighborhood methods
 - ▣ MODE object based verification
 - ▣ Wavelet decomposition

How do I get it?

- ❑ Download from the web site.
- ❑ Compile and run.
- ❑ Read manual.
- ❑ Attend Tutorial
 - ❑ January 2014
- ❑ Use `met_help@ucar.edu`



A screenshot of a web browser displaying the 'MET Users Page' at www.dtcenter.org. The page has a dark header with navigation links like 'DTC home', 'Reference Configurations', 'Testing & Evaluation', 'Community Codes', 'Verification', and 'Visitor Program'. Below the header, there's a section titled 'Model Evaluation Tools | DTC' with a 'Welcome' message and a 'Description' of the MET system. The 'Description' states that MET is a highly-configurable, state-of-the-art suite of verification tools developed by the National Center for Atmospheric Research (NCAR) and supported by the U.S. Air Force Weather Agency (AFWA) and NOAA. It lists various verification techniques provided by MET, such as standard verification scores, spatial verification methods, and ensemble methods. On the right side, there are sections for 'Events' (including a 2013 GSI Tutorial and GSI release), 'Announcements' (including HWRV system release and GFDL vortex tracker release), and 'MET News' (including METv4.1 release and MET Online Tutorial).

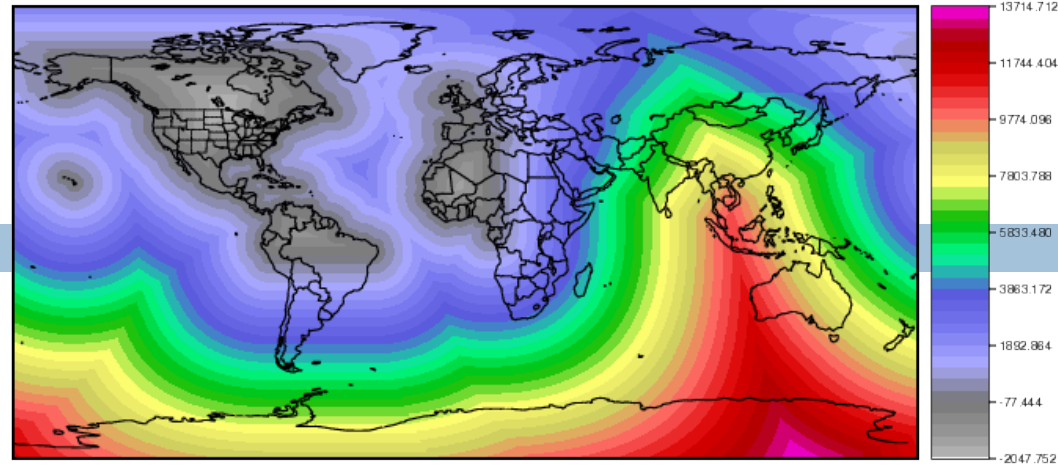
MET v4.1 – Released last month

- MET – TC to support verification of tropical cyclone forecasts
- Series analysis tool summarizes verification statistics in any series (e.g. time, height) at each grid point in domain.
- MODIS data preprocessor.
- Spread skill statistic in ensemble tool.
- little_r and SURFRAD handled in preprocessing tools.

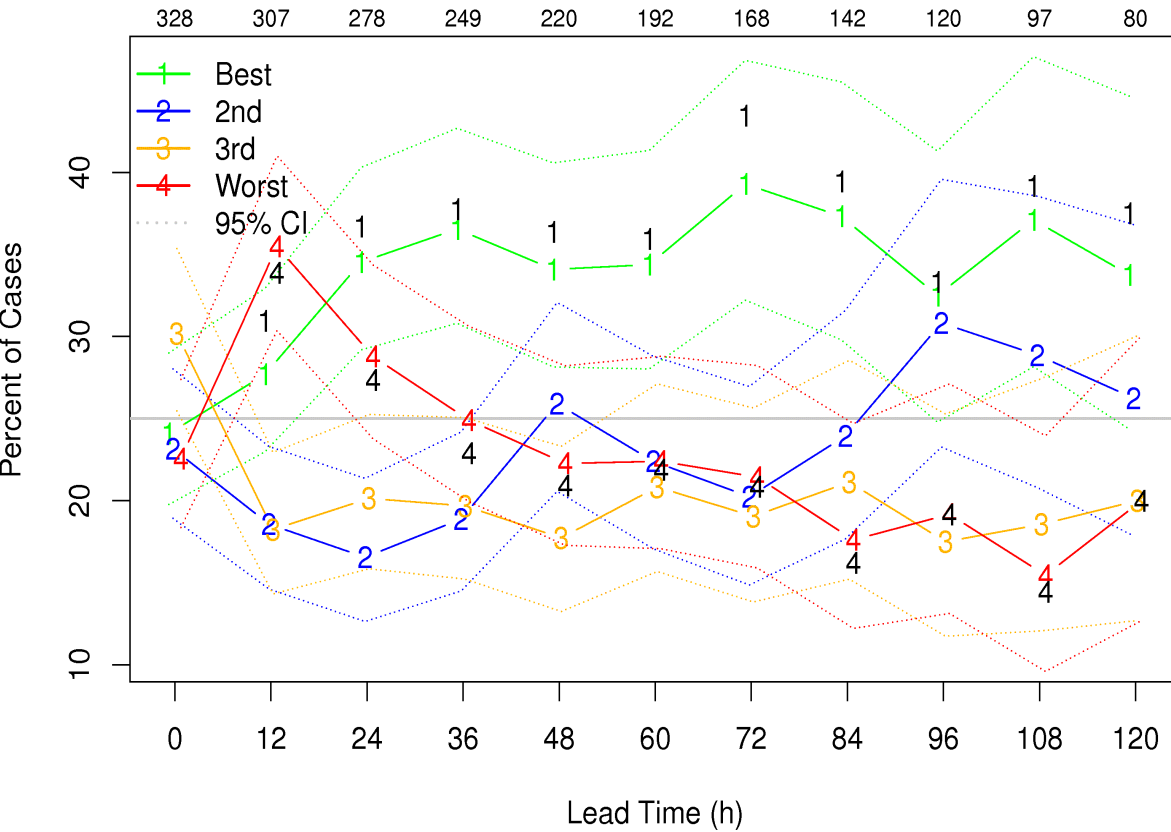
MET v4.0 – Released last year

- GRIB2 support
- Plotting tools for point and gridded data
- Streamlined configuration files
- Better unit testing
- Bug fixes

MET-TC

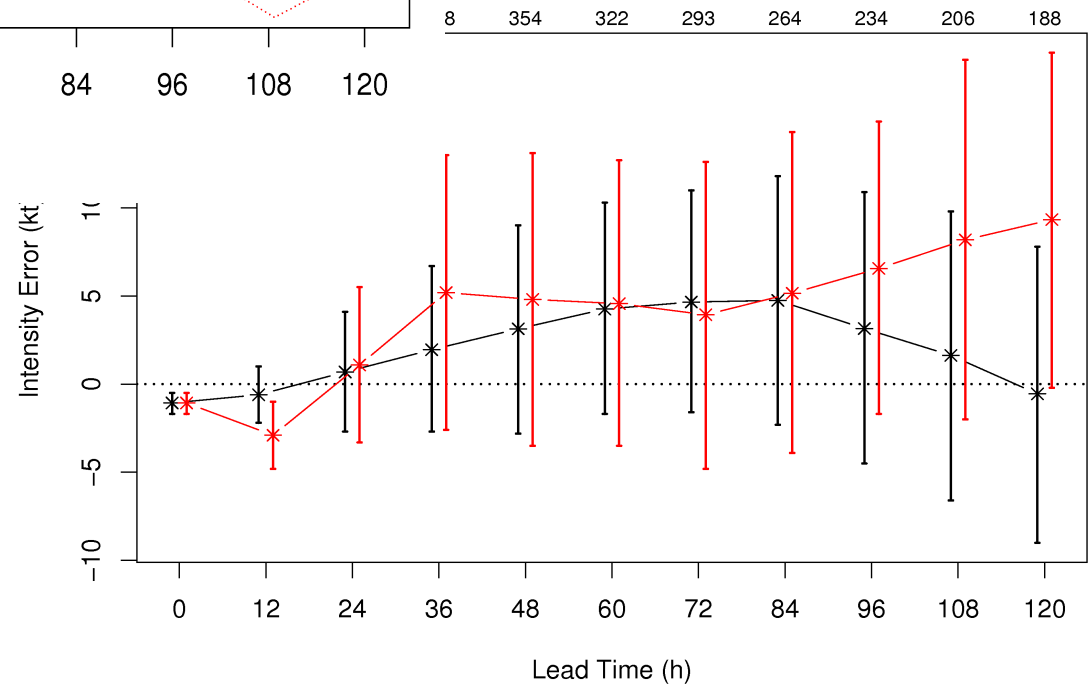


- ❑ Duplicates and extends NHC verification capability for A Decks and B Decks.
- ❑ Track and Intensity Errors
- ❑ Radius of Maximum winds by quadrant.
- ❑ Basic rapid intensification evaluation.
- ❑ Many R-scripts for plotting.
- ❑ See poster by Kathryn Newman for details.



Example results from MET-TC.

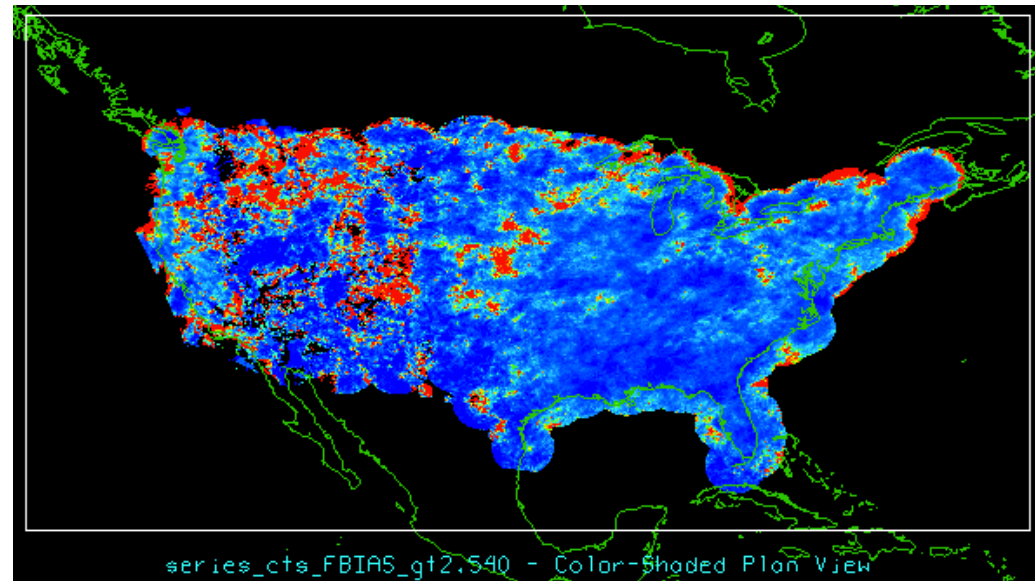
**Mean Intensity Error
tropic Basin (Land and Water)**



Ability to represent verification results spatially

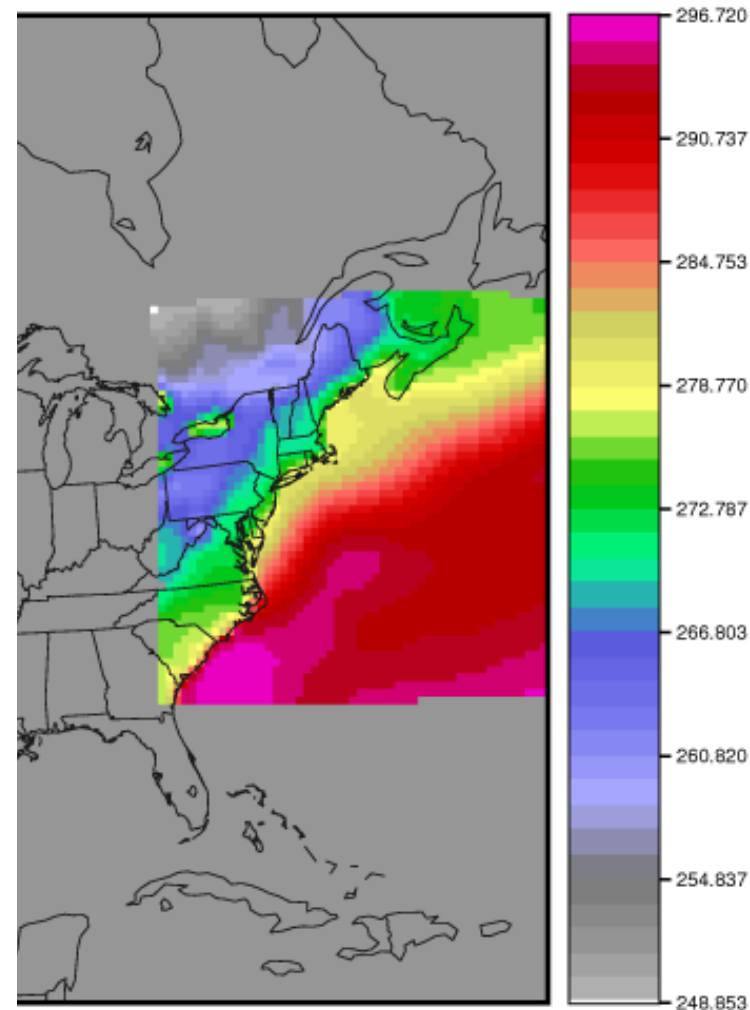
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- Ability to accumulate statistics at each grid location over some series.
 - ▣ Time
 - ▣ Height
 - ▣ User-specified
- Produces NetCDF file.

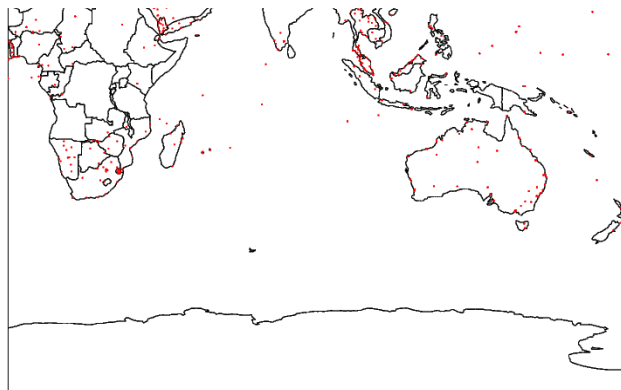
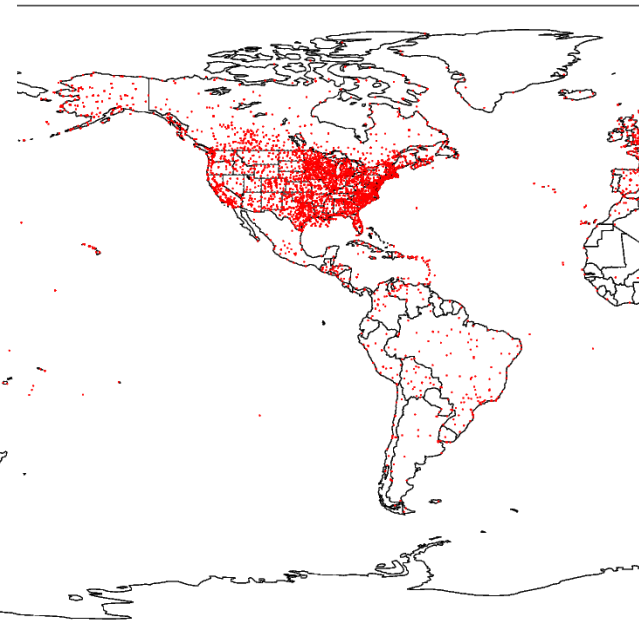
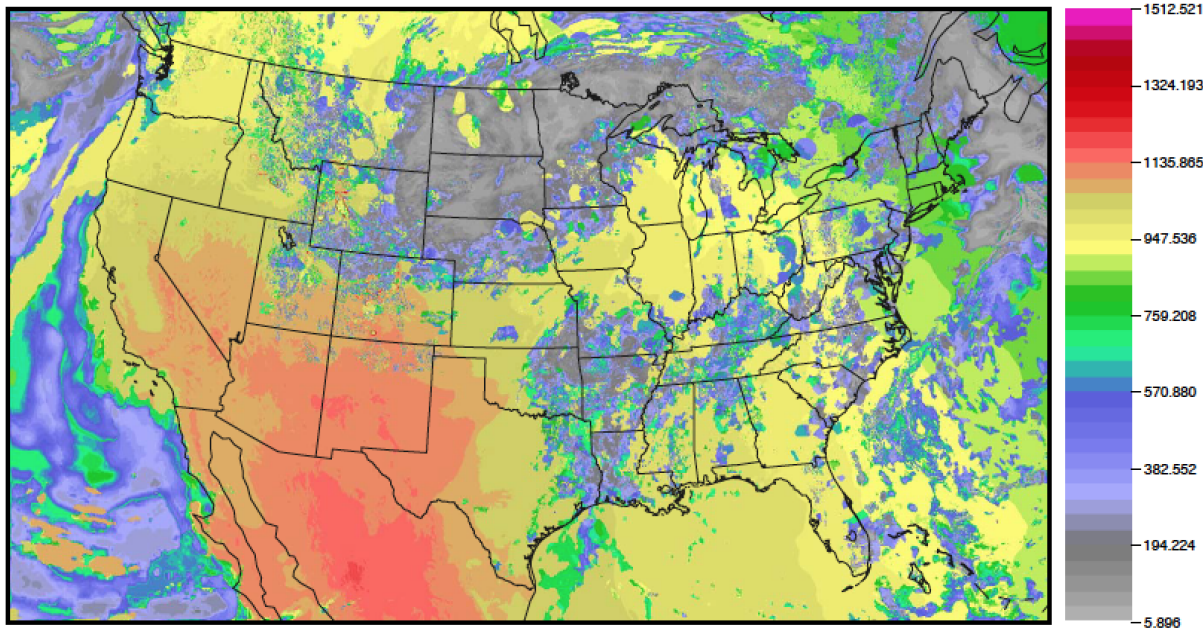


MODIS data preprocessor

- HDF-EOS files converted into MET NetCDF.
- Allows use of MODIS products as observations for verification.
- Developed and tested on Level 2 cloud product.
- <http://ladsweb.nascom.nasa.gov/>

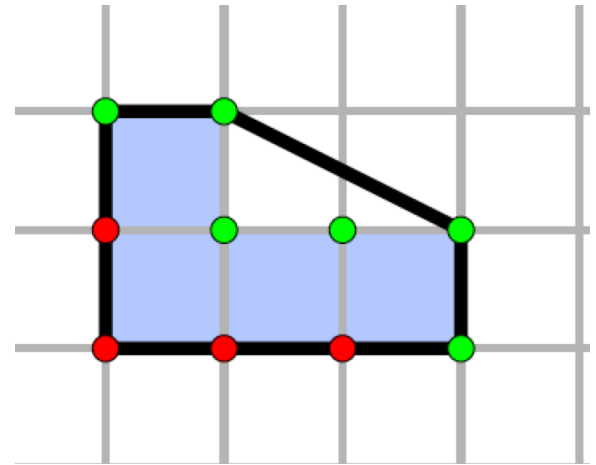


Example plots from plotting scripts



Bug fixes

- MODE areas
 - ▣ Previous versions overestimated areas somewhat
 - ▣ Larger objects less affected
- Prepbufr virtual temperature coded as temperature.
 - ▣ Results may show false cold bias.
- Other small bug fixes.



Summary

- MET is a community tool for model forecast evaluation, which incorporates many of the latest methods
 - ▣ Modular architecture
 - ▣ Highly configurable
 - ▣ Extensive user support
- New tropical cyclone verification
- New spatial / series verification
- Additional satellite observation preprocessor.
- Little-r and SURFRAD observations preprocessed by existing tools.
- More graphics support.

For more information:

<http://www.dtcenter.org/met/users/>