Recent developments in the METplus verification tool suite

Molly Smith[1,2,4], Daniel Adriaansen[4,5], Hank Fisher[4,5], Lisa Goodrich[4,5], John Halley Gotway[4,5], Tara Jensen[4,5], Christina Kalb[4,5], George McCabe[4,5], John Opatz[4,5], Julie Prestopnik[4,5], Mallory Row[6], Jonathan Vigh[4,5], Minna Win-Gildenmeister[4,5]

[1]CIRES, Boulder, CO; [2]NOAA GSL, Boulder, CO; [3]CIRA, Ft. Collins, CO; [4]DTC, Boulder, CO; [5]NSF NCAR RAL, Boulder, CO; [6]I.M. Systems Group at NOAA EMC, College Park, MD.

A major component of the Unified Forecast System Research-to-Operations (UFS-R2O) project has been the implementation of the Developmental Testbed Center (DTC)'s Model Evaluation Tools (METplus) as a unified verification system for community model development efforts. A community verification system is important for this sort of decentralized development endeavor, as it gives all participants a common framework for evidence-based decision making when transitioning these models to operations. METplus processes numerical weather prediction and Earth system model output, as well as matched "truth data" (which includes observations, analyses, tropical cyclone tracks, etc.), into a standardized format. METplus then computes a wide range of verification metrics to assess model performance. A major strength of METplus is that active development continues, with new, community-requested tools and metrics added each year.

One of the biggest ongoing efforts with METplus is to add support for verification on unstructured and native grids, reducing the amount of pre-processing and regridding necessary to verify model output. This will save time and computational resources for users, as well as decrease the chances of producing unphysical artifacts in a dataset through regridding. Adding support for unstructured grids has been a community effort, with contributions from numerous sponsors and stakeholders.

METplus developers are also completing a multi-year refactoring effort, which will make METplus much more performant and easier to configure. Additionally, they have added new subseasonal-to-seasonal (S2S and SFS) metrics, and explored innovative, cloud-based database options for storing METplus data. Emphasis has also been placed on improving the cyber-security of the METplus codebase, making it suitable for use in an operational environment. All of these efforts help to make METplus into a valuable common community verification package, utilized and built upon by meteorological agencies around the world.