**MET and MET-TC: Tools for Evaluating Predictions of Tropical Cyclones and their Impacts**

Barbara Brown, Tara Jensen, Kathryn Newman, Tressa Fowler, John Halley Gotway, Paul Kucera, and Randy Bullock

National Center for Atmospheric Research

Boulder, Colorado, USA

**Abstract**

The Model Evaluation Tools (MET), developed and supported by the U.S. Developmental Testbed Center (DTC), has become a cornerstone tool in the DTC testing and evaluation process. It also is applied world-wide by over 2,500 registered users. MET is a freely-available, supported software package for forecast verification. MET capabilities include tools for application of traditional verification methods (e.g., ACC, RMSE), focused mainly on comparing gridded forecasts to verify point or gridded observations. To account for the uncertainty associated with these measures, methods for estimating confidence intervals for the verification statistics are an integral part of MET. MET also includes state-of-the-art tools for application of new spatial methods, including object-based and neighborhood approaches that provide more meaningful diagnostic information regarding the forecast performance for coherent spatial fields such as precipitation. Some of these methods are particularly appropriate for assessment of the performance of tropical cyclone impact and structure predictions (e.g., precipitation, flooding, wind structure).

MET-TC is a new addition to the MET software package. MET-TC is a set of tools designed to aid in tropical cyclone (TC) forecast evaluation and verification. This toolkit provides a standard set of verification metrics and comprehensive output statistics, which can be used for evaluations and homogeneous comparisons of track and intensity forecasts, including examination and comparison of error distributions, application of conditional evaluations, and estimation of statistical confidence intervals. MET-TC was developed by the DTC as part of the Hurricane Forecast Improvement Project (HFIP). The initial version of MET-TC replicates the functionality of the current U.S. National Hurricane Center (NHC) verification software, and provides added functionality for subsetting and comparing forecasts. The MET-TC code is designed to be modular, allowing additional capabilities and features to be added in future releases.

Together, MET-TC and MET provide a comprehensive set of tools for evaluation of TC predictions of track and intensity, storm structure, and TC impacts. These packages are freely available at <http://www.dtcenter.org/met/users/index.php>. The tools’ capabilities and example applications will be described in this presentation.