Verification and Diagnosis of Ensemble QPF forecasts during Extreme Precipitation Events in California during the HMT Winter Exercises

Ed Tollured

NOAA/OAR/Earth System Research Laboratory

For three winter seasons the Hydrometeorological Testbed (HMT) has collaborated with the Developmental Testbed Center (DTC) to assess numerical forecasts of severe precipitation events (orographic in nature) in the California Coast Ranges and Sierra Nevadas. These assessments have primarily focused on verification of quantitative precipitation forecasts (QPF), and on the ability of forecasts systems like the GSD ensemble 9km nested mode to capture heavy precipitation scenarios like atmospheric rivers. In the DTC-based Model Evaluation Toolset (MET) are utilities encompassing a full range of verification methods (including traditional categorical scoring, probability-based scores, and newer object-based spatial statistics) that provide useful diagnostic information about modeling options and their relevance to precipitation systems. For instance, the value of high-resolution nested domains, the relative performance of different microphysical schemes, and the impacts of choices between verification data sets (e.g., analyses vs. point precipitation observations) have been investigated. We present some salient results from these comparisons by particularly focusing on display options that maximize usefulness by combining several scores on so-called 'performance diagrams'. Also presented are object-based scoring results produced by the Model Evaluation Toolset (MET) and the MET Object-based Diagnostic Evaluation tool (MODE) applied to observed and forecast objects on spatial precipitation fields. The implications for our understanding of severe precipitation are discussed as well.