

Title: Performance of the Freezing Rain Accumulation National Analysis (FRANA) and updates for this winter season.

Authors: Daniel D. Tripp, Adam D. Werkema, Heather D. Reeves, Brian L. Barjenbruch, Kristopher J. Sanders

Abstract: In response to a NWS requirement for a gridded analysis of ice accumulation, the Freezing Rain Accumulation National Analysis (FRANA) is created for nowcasting and post-event verification of freezing rain/drizzle (FZRA/FZDZ) ice accumulations. This product generates CONUS-wide hourly flat and radial ice accumulations for 1, 3, 6, 12, and 24 hour windows. The core science algorithm within FRANA that converts liquid to an ice accumulation is the Freezing Rain Accumulation Model (FRAM). The inputs to FRANA come from the High-Resolution Rapid Refresh analyses of 2-m wetbulb temperature and 10-m wind speed and the Multi-Radar/Multi-Sensor (MRMS) hourly multi-sensor Quantitative Precipitation Estimate. An additional trace ice footprint was added to FRANA to help forecasters identify areas of light FZRA/FZDZ.

A three-year retrospective analysis reveals that FRANA can overestimate or underestimate the icing footprint due to NWP temperature uncertainty, precipitation-type error, radar overshooting, precipitation evaporating below the lowest radar tilt, or due to MRMS quality control. For accumulating ice, FRANA has a modest RMSE of 1.27 mm (0.05 in) and event-maximum errors typically less than 2.54 mm (0.1 in). In fact, 88% of the events in the study had less than 2.54 mm (0.1 in) absolute error which is within the tolerance range for many operational applications. Additionally, lower storm-total accumulations are found to be associated with lower absolute error. In this talk, the performance of FRANA, case studies, and updates for this winter season will be presented along with an overview of the testbed activities.