**Development of Operational Products from the New York State Mesonet to Aid Forecasts of High-Impact Weather Events by National Weather Service Forecast Offices: Freezing Rain Project**

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Over the last two years, meteorologists from the National Weather Service (NWS) and the New York State (NYS) Mesonet came together to enhance the usage and integration of NYS Mesonet data into NWS forecasts and warning processes. The project was funded by COMET and was broken into three projects: Flash Flooding, Freezing Rain, and Severe Convection. This talk will be focused on the freezing rain project findings.

The goal of the freezing rain study was to investigate NYS mesonet data during such events to learn which parameters may help improve NWS forecasters’ ability to predict freezing rain events. 99 events (most were short lived, averaging one to two hours) were analyzed across NYS starting with the winter of 2017 - 2018 and ending with the winter of 2019 - 2020. The following parameters were found to be useful predictors: 2-meter temperatures, 5-cm soil temperatures, 24 hour average temperature, irrandance and wet bulb temperatures. A positive correlation between frequency of freezing rain events and wet-bulb and 2-meter temperatures was found when these values ranged between 28 and 32 degrees. Five cm soil temperature was not found to be a good predictor of freezing rain events. State maps that display these key parameters from NYS mesonet sites were created to facilitate NWS forecasters ability to quickly ascertain conditions during potential and ongoing freezing rain events.

Finally, since gathering reliable and accurate ice accretion amounts can be challenging, a test was done to evaluate output from the Freezing Rain Accumulation Model (FRAM), initialized by observations from the New York mesonet. Output was evaluated from the February 15 - 16, 2020 freezing rain event and the FRAM output closely matched ice accretion measurements from ASOS sensors in NYS. These results are encouraging and upon further testing, integrating NYS mesonet observation into the FRAM may prove to be a valuable asset to NWS verification by greatly improving the spatial resolution of the observations.