Using the Weather Research and Forecasting (WRF) model to predict ground/structural icing

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In the past few years, the WRF model has gained widespread usage in many areas of weather forecasting. Specific application to the problem of ground/structural icing is still in its early stages but potential exists to apply direct model outputs as one component of a ground icing forecast system. The most important consideration is the treatment of water species, which the model community calls microphysics. Using a physics option that properly treats the ice and liquid water phases is critical. A tendency to predict too much ice will mean that supercooled liquid water is under-predicted.

Recently, the WRF model has been used to predict icing of wind turbines. The primary focus has been small droplet icing that considers only the cloud water from the model. To advance the problem further, more attention is needed on the forecast of larger drops, which the model may term rain, but the actual variable also encompasses drizzle. Therefore, more focus is needed on freezing drizzle and freezing rain, which can create a much larger accumulation of icing on ground structures.

This study will present preliminary results of one or more case studies involving freezing drizzle or freezing rain as the primary contributor to ground icing. It will suggest the dominant sensitivities in the model for consideration in designing a real-time forecasting system.