



Forecast Parameters for US Hail Occurrence and Size

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Forecasting the occurrence of different types and sizes of hail can be challenging on the operational time scale. Despite posing the risk of locally incredible damage and a higher frequency of large loss swathes than tornadoes, comparatively little attention has been given to our understanding of the relationship between environmental characteristics and hail occurrence and size. Thermodynamic sources of energy are essential to promote the strong updrafts that support hail. However, based on recent research enhancement of updrafts via vertical wind shear and or helicity relative to storm motion is also an important contribution to large hail formation. However, interactions on the microphysical scale, moisture loading and structure of the vertical temperature profile can influence the potential for relatively large hail, meaning that indices for calibrated for other severe phenomena may not be representative of the appropriate set of ingredients.

Observations of hail as data to identify an environmental relationship, like those of other severe thunderstorm phenomena commonly suffer from a number of non-meteorological temporal and spatial inhomogeneities. The availability of a recently compiled dataset of Rapid Refresh proximity soundings from the NOAA/NWS Storm Prediction Center, combined with Maximum Expected Hail Size from Multi-Radar Multi-Sensor observations as a proxy for hail occurrence, and Storm Prediction Center Storm Data hail reports to complement this dataset presents an opportunity to improve our understanding of parameters for hail forecasting. For the purposes of this presentation, classes considered include larger accumulations of smaller hail, very large hail (>4 inches), and long-lived and significant right and left moving supercells. New results characterizing forecast parameters and profile characteristics for different hail classes and storm characteristics will be presented.