Eastern Colorado Hailstorms: Meteorological and Societal Perspectives on Human Exposure and Vulnerability

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Eastern Colorado is one of the most active hail regions in the U.S., and recent damaging events have affirmed the need for improved prediction of hailstorm characteristics and effective warning communication. This work offers a multidisciplinary synthesis of eastern Colorado (37-41°N, 102-105.3°W) hailstorms. Climatologically, severe (1.0 in+) hail reports and days are increasing across the domain since 1997, although hail is preferentially reported where people live or drive. Still, the upward trend in hail days is not seen in the national record. To estimate how the frequency and spatial distribution of hailstorms across eastern Colorado may change by the end of the 21st century, threshold exceedances of convective proxies for severe hail reports are compared between control and future high-resolution dynamically-downscaled WRF simulations. An increase of up to 3 severe hail days per year is projected by the period 2071-2100, with the highest increase across the north-central eastern Plains. These projections, paired with high-resolution population projections taken from the Shared Socioeconomic Pathways, are input into a Hail Monte Carlo model, which predicts an increase in human exposure up to 178% by 2100. Results are sensitive to the overlap between future population and meteorological projections, however, and simulations that predict decreasing human exposure have a corresponding increase in agricultural exposure due to hailstorm frequency increasing most in places where population is not expected to grow. An interview study conducted in Summer 2019 with eastern Colorado agriculturalists revealed feelings of anxiety and dejection from hailstorms due to the financial losses incurred. Farmers also highlighted that small hail, either in large volume or driven by a strong wind, is most damaging to crops, which is contrast to the 1.0 in severe threshold used by the NWS. Results from this work are bringing awareness of the vulnerabilities faced by the agricultural sector and inspiring continued research into hail prediction.

***Thursday, 20 February 2020, 3:30 PM**

Refreshments 3:15 PM

NCAR-Foothills Laboratory, 3450 Mitchell Lane

***Please note special location: FL2-1001, Small Auditorium**

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