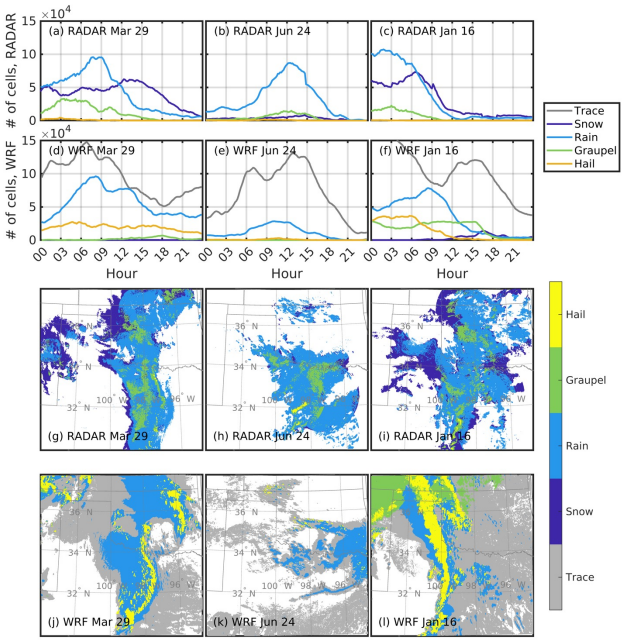
Deep convection in the Southern Great Plains (SGP)

U.S. Department of Energy | Office of Science
HYPERFACETS
A Framework for Improving Analysis and Modeling of Earth System and Intersectoral Dynamics at Regional Scales



Hydrometeor classes during March 29, June 24 and January 16, 2017 as derived from dual-polarization RADAR and simulated by WRF using the Milbrandt-Yau microphysics scheme.

Scientific Achievement

Very high-resolution simulations with the Weather Research and Forecasting (WRF) model are performed and subject to uniquely detailed fidelity assessment. Although this simulation exhibits fidelity for the marginal probabilities of wind speed, rainfall rates, and hail occurrence, the joint probabilities of these properties and the maximum size of hail are, as yet, not sufficient to characterize potential damage to key renewable energy industries.

Significance and Impact

Extremely heavy rain and hail during convective events is challenging to simulate but represent important atmospheric hazards including to the renewable energy industry. Understanding the degree to which convection permitting simulations represent these phenomena is critical to informing needed improvements and contingent risk assessments.

Research Details

7-months of WRF simulations with grid spacing of 1.3km are performed for a large domain centered over the SGP and evaluated in terms of the fidelity of critical variables for applications to the wind and solar industries.

Pryor S.C., Letson F.W., Shepherd T. and Barthelmie R.J. (2023): Evaluation of WRF simulation of deep convection in the US Southern Great Plains. *Journal of Applied Meteorology and Climatology* **62** 41-62 doi: 10.1175/JAMC-D-22-0090.1 .