Skill from Reflectivity Data Assimilation

HRRR Forecast Skill for Reflectivity (30 dBZ)

Critical Success Index X 100

Less Skill → More Skill

Forecast Length (Hours)

0.0  4.0  8.0  12.0

radar data assimilation in RAP and HRRR

no radar data assimilation
Skill from Reflectivity Data Assimilation

HRRR Forecast Skill for Reflectivity (30 dBZ)

- only operational NOAA models that assimilate reflectivity data
- reflectivity → heating rate: low-cost assimilation, significant forecast improvement

Critical Success Index X 100

Less Skill More Skill

radar data assimilation in RAP and HRRR

no radar data assimilation

Forecast Length (Hours)
Example: With and Without Radar Data Assimilation

RAP radar DA improves convective forecast in both RAP and HRRR.
Additional HRRR radar DA improves fine-scale initialization of HRRR.

15-minute HRRR forecast

observed reflectivity

no radar DA

radar DA in RAP and HRRR
RAP radar DA improves convective forecast in both RAP and HRRR
Additional HRRR radar DA improves fine-scale initialization of HRRR

3-hour HRRR forecast

no radar DA

observed reflectivity

radar DA in RAP and HRRR
Near Future: HRRR Ensemble Data Assimilation

Improved *probabilistic, high-resolution, 0-6 h forecasts* of winds, clouds, and convective storms

Applications: energy, aviation, fire weather, hydrology, Warn on Forecast