

m ASL) to 1540 m near the top of the model (20 km ASL)

•Model time step: 5 sec

•Flat bottom boundary; open lateral boundaries •No surface radiative fluxes or boundary layer physics

•Microphysical parameterization: Lin et al. (1983)

WRF-DART ٠DA package: radar DA module (www.image.ucar.edu/DAReS/DART/), rev. 3810

·Assimilation cycle: 120 sec

•Data assimilated: Z (σ_z = 5 dBZ) and V_r(σ_{vr} = 2 m s⁻¹) from WSR-88D at Dodge City, KS (KDDC), supplemented by V, data from UMass X-Pol mobile radar (Tanamachi et al. 2009)

•Additive noise (Dowell and Wicker 2009): 1.0 m s⁻¹ for u and v, 0.5 K for T and T_d, every 120 sec in regions with $Z \ge 25 \text{ dBZ}$ ·Initial environment: Horizontally homogeneous w/randomly placed thermal bubbles

•Ensemble: 48 members, generated by adding random perturbations (~N[0,2 m s⁻¹]) to the two velocity profiles (0100 VAD and 0230 VAD) shown below



*Historically speaking the date of the Greensburg storm and tornadoes is 4 May 2007. However, the Greensburg storm occurred entirely on 5 May 2007 in UTC.

the overall storm structure or observation-space diagnostics. The locations of the main supercell updraft and Greensburg tornadolike vortex are similar in both experiments. ertical vorticity In time-height cross sections of max.

•The initial wind profile does not appear to exert much influence on



h = 1.2 km AGL

8

Results:

vertical vorticity in the simulated Greensburg storm (left), it can be seen that vortices are generated earlier in the 0100 VAD experiment, but that the vortex in the 0230 VAD experiment is deeper, more persistent, and more intense, particularly near the surface.

Surface

•RMSI values (right) indicate that the assumed observation error for $V_r (\sigma_{vr} = 2 \text{ m s}^{-1})$ may be too small.

•The consistency ratio (Dowell and Wicker 2009) is slightly less than 1 at most times, indicating insufficient model spread.

Observation-space diagnostics: https://www.vel.DCITY at 1000 m tep:rep Skn. Kpbc-Lutuses, orbo drc Vxb Inn, Kbbc-Lutuses, orbo drc Vxb Inn, Kbbc-Lutuses, orbo drc Vxb manhading 6.0

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Surface

7-8 km

h = 7 km AGI

-15

-20

Acknowledgments: David Stensrud suggested the focus of this study. Discussions with Glen Romine, Les Lemon, Mike Umscheid, and Daniel T. Dawson II were informative and instructive.

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