List of Supplemental Figure Captions

Figure 1: Time series comparing the buoyant VPPGA (m s$^{-2}$) for both the lower shear Goshen Control (blue) and the higher shear Goshen BSS (red) supercells. Top panels show the maximum acceleration value for both the 0-1 and 0-3 km layers in a 50 x 50 km box following the supercell’s mesocyclone. The bottom panels are similar to the top panels, except displayed is the storm averaged acceleration in the 50 x 50 km box. The BSS process for the higher shear simulation begins at 1.5 hr, indicated by the dark black line.

Figure 2: Skew T-logp diagram and (right) hodograph showing the thermodynamic and kinematic environment used in the horizontally homogenous base-state substitution (BSS) simulations for the 5 June 2009 “Goshen County” Tornadic Supercell case. The Skew T-logp shows the 2335 UTC BSS thermodynamic profiles. The wind barbs on the Skew T-logp correspond to the BSS1 sounding and are displayed in knots. The sounding displayed is directly from the model’s initial conditions and the modifications to the Control sounding are described section 2c. Temperature is in red and dewpoint temperature is in green, while the dashed brown line indicates the path of a surface based parcel above the level of free convection. The wind barbs on the Skew T-logp correspond to the Control sounding and are displayed in knots. On the hodographs, the 1, 3, and 6 km data points are denoted with symbols as shown, with the simulated storm motion plotted with “M”. Control (blue) and BSS (red) wind profiles refer to the 0039 and 0139 UTC soundings respectively.

Figure 3: As in supplemental Figure 2, except the Skew T-logp shows the 0057 UTC BSS2 thermodynamic profile. The wind barbs on the Skew T-logp correspond to the BSS2 sounding and are displayed in knots. The sounding displayed is directly from the model’s initial conditions and the modifications to the BSS2 sounding are described section 2c.

Figure 4: Time height plot of (left) the maximum vertical vorticity (s$^{-1}$) and (right) the maximum vertical velocity (m s$^{-1}$) in a 50 x 50 km box following the supercell’s mesocyclone for both the higher shear Goshen BSS (top) and the higher shear Goshen BSS with thermodynamic changes (bottom). The BSS process and the thermodynamic changes (if applicable) begin at 1.5 hr, indicated by the dark black lines.

Figure 5: Time height plot of (left) the maximum vertical vorticity (s$^{-1}$) and (right) the maximum vertical velocity in a 50 x 50 km box following the supercell’s mesocyclone for the lower shear Goshen Control (top row) and the lower shear Goshen Control with 2, 4, and 8 K stabilization simulations (bottom three rows, respectively). The stabilization process begins at 1.5 hr, indicated by the dark black lines. Although no stabilization occurred in the lower shear simulation (top row), a faded black line was placed at 1.5 hr for reference.

Figure 6: As in supplemental Figure 5, except for the higher shear Goshen BSS (top row) and the higher shear Goshen BSS with 2, 4, and 8 K stabilization simulations (bottom three rows, respectively). The BSS and stabilization (if applicable) processes begin at 1.5 hr, indicated by the dark black lines.
Figure 7: As in supplemental Figure 2, except for the 12 May 2010 “Clinton, OK” Tornadic Supercell case. Control and BSS wind profiles refer to the 0039 and 0139 UTC (13 May 2010) soundings respectively. The Skew T-logp shows the 0039 UTC Control thermodynamic profile.
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