

MEA444: Mesoscale Analysis & Forecasting
Lab 8

due: Tuesday, 14 April, 2009

COMET MCS Matrix, available at <http://meted.ucar.edu/convectn/mcsmatrix/index.htm>

Refer to the matrix to answer the following questions. There is no grid worksheet to fill out here... we are making direct head-to-head comparisons.

1. Compare Matrix simulations A1, C1, and G1. Considering the role of shear strength and depth, answer the following 5 questions. [A] Which simulation produces the strongest, most continuous (in time) FTR flow? [B] Which simulation produces the strongest, most elevated rear-inflow jet? [C] Which simulation produces the most stratiform precipitation? [D] Which simulation produces the most bowing structures? [E] Which simulation produces the most isolated cells?
2. Compare Matrix simulations trios C1/D1/E1 and G1/H1/I1. How does the orientation of the shear vector relative to the initial squall line effect system evolution?
3. Compare the evolution of 2D, long squall lines to that of the shorter, 3D, non-Coriolis squall lines (simulation pairs A1/A2 and C1/C2). How is system evolution altered when the line ends are in closer proximity?
4. Compare the 3D non-Coriolis simulations to the 3D simulation WITH Coriolis forcing (simulation pairs A2/A3 and C2/C3). How does the presence of Coriolis forcing alter system evolution?
5. Compare all of the 3D simulations with Coriolis forcing (A3 through J3) to answer the following questions. [A] Which simulations produce the largest regions of stratiform precipitation? [B] Which simulations produce the strongest, most elevated rear-inflow jet? [C] Which simulations produce the best defined Mesoscale Convective Vortices (MCVs)?
6. Again comparing all of the 3D simulations with Coriolis forcing (A3 through J3), answer the following questions. [A] Which simulations produce bow echoes? Which parameter best distinguishes bow echo simulations from non-bow echo simulations? [B] Which simulations produce supercells? Which supercells persist the longest? [C] Does BRN help distinguish whether a simulation produces supercells? How about Us over 2.5 km? Us over 5 km?
7. Compare the "Jet" simulations (B1, B3, F1, and F3) with the others. How does the reversing shear above 2.5 km AGL affect system evolution?

Remember to turn in your pre-lab along with this main part of the lab!