ATM 311 Convective Storm Matrix and Duanesburg Tornado

This is a two-part assignment. For the first part, refer to the UCAR COMET module on the convective storm matrix, as shown in class, and in the link below (*note: you will have to create an account, which is very quick and easy…and worth it for all of the great COMET modules available!)*:
https://www.meted.ucar.edu/convectn/csmatrix

Note that the lower numbers on each hodograph indicate the magnitude of the wind shear, while the upper number indicates the depth (above ground level) in km of the shear layer.

1. Which simulation (e.g., N3) produces one of the strongest right-moving supercells? Describe the environment (shear and instability) associated with this simulation.

2. Which simulation produces dominant left-moving supercells? Again, describe the environment (shear and instability) associated with this simulation.

3. Pick a simulation where convection completely (or nearly completely) dissipates by the end of the simulation. Why does this particular buoyancy/shear environment result in short-lived convection? For this answer, be sure to also note which simulation you've chosen.

For the second part of the assignment, refer to the paper ***Topographic and Boundary Influences on the 22 May 2014 Duanesburg, New York, Tornadic Supercell***, by Tang et al. (2016): https://www.atmos.albany.edu/facstaff/ralazear/ATM311/Home_files/Tang_et_al_2016.pdf

4. Within which pressure layer is the elevated mixed layer (EML) in the morning (12Z) Buffalo sounding? Describe the conditions that led to this EML over New York State on 22 May.

5. During the peak intensity of the tornado, how low was the correlation coefficient in the East Berne, NY radar (KENX) within the "debris ball"?

6. Fig. 13 displays sea-level pressure and winds for three stations—from west to east, Johnstown (KNY0), Schenectady (KSCH), and Albany (KALB). When is the maximum pressure difference between KNY0 and the stations to the east (KSCH/KALB)? How does this play a role in enhancing vertical wind shear in the Mohawk Valley?