Comparing WRF Modeled Fields to Observations for the 9-10 June 2003 MCS Observed During BAMEX
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Motivation
- Modeled and observed mesoscale convective systems (MCSs) account for a substantial amount of summertime precipitation
- Many methods of evaluating simulated MCSs exist (rainfall rate, vertical velocity, maximum reflectivity, etc.) but these cannot account for horizontal and vertical variability of these quantities within the MCS
- Here, methods of comparing the bulk statistical properties of an MCS sampled during the Bow Echo and Mesoscale Convective Vortex Experiment (BAMEX) are presented

Example from June 9-10, 2003
- Observations obtained from two radars on board NOAA and NRL P-3 aircraft flying ahead of and behind the convective line
- This provides a unique high-resolution dataset including dual- and quad-Doppler data

How to Develop CFADs
(a) Mask area of storm (black line) using points with maximum column reflectivity > 0 dBZ
(b) Create histogram for each x-y slab
(c) Develop CFAD from histograms

Contoured Frequency by Distance Diagrams (CFDDs)
- Like CFADs, but frequencies plotted as function of distance behind leading anvil edge rather than altitude
- Y-axis oriented parallel to rear inflow jet (RIJ), x-axis perpendicular to y-axis, z-axis vertical

Model vs. Observations CFADs
- Highest frequencies occur at similar Z, but very different distribution with respect to altitude

Model vs. Observations CFDDs
- Variable bins along x-axis
- Distance front to rear on y-axis
- Colors represent frequency of occurrence

Average Altitude per Bin Diagrams (ABDs)
- CFDDs do not have information about vertical distribution
- ABDs constructed in the same manner as CFDDs, but colors represent altitude rather than frequency

Conclusions
- CFDDs and ABDs are new methods for comparing modeled MCSs to observations
- Allow for examination of statistical distribution of quantities rather than specific values

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