Quality Control Techniques for Precipitation Radar
A. Theisen¹, S. Collis², S. Giangrande³, and R. Peppler¹
1-ARM Data Quality Office, CIMMS/University of Oklahoma Norman, OK
2-Argonne National Laboratory
3-Brookhaven National Laboratory

Point Targets
• Isolated point targets can be useful for gaining health and status information about an individual radar
• A point target can be anything that returns a signal, including buildings, radio and water towers, railroad tracks, bridges, etc...
• Point target reflectivity can be tracked over time and used to calculate the radar beam pattern

Beam Patterns
• Point targets can be used to determine a rough beam pattern of a radar’s antenna
• Radars do not radiate energy uniformly, beam patterns can indicate how the energy is radiated from the radar

Differential Reflectivity Average Profiles
• Differential reflectivity, $Z_{dr}$, is the ratio of the power returned in the horizontal plane to that returned in the vertical plane; it gives an idea of the hydrometeor shape
• Rain should “look” circular to the radar when view from directly below and $Z_{dr}$ should be around 0 dB
• Offset from 0 dB may indicate a bias with the radar

Surface Precipitation Comparison
• Rain rates are calculated over the SGP Central Facility using a Marshall-Palmer Z-R relationship
  - $A=200, b=1.6$
• 60 minutes accumulations calculated from the radar are compared with surface precipitation instruments (left)
• Reflectivity from the CSAPR is compared with the 2D video disdrometer calculated radar reflectivity (right)

Instrument Comparison
• Profiles of radar reflectivity over the CF’s are extracted for comparison (right)
• VCEIL cloud base heights (white) and surface precipitation flags (blue) overlayered
• Lidars, wind profilers, and disdrometers are also used in comparisons (not shown)