Correcting AP mitigation within Composite Reflectivity Products

Leaving precipitation returns alone while maintaining the current ability of the AP mitigation algorithm
• AP mitigation within ORPG CRPs has always produced a negative side effect of reducing reflectivity intensities in regions of precipitation by as much as 15 dbZ.

• The erroneous reduction in reflectivity magnitudes is a systematic problem – existing regardless of type of precipitation system, geographic location, or season.

• This has prompted the removal of AP-edited CRPs from the display system of the FAA’s Weather and Radar Processor (WARP) used at Air Route Traffic Control Centers.
AP identification assumes clutter return is primarily from a stationary scatterer. Thus

- Low (near zero) radial velocity and,
- Small spectrum width

Mitigation of AP in a radar volume

- removal by region
- removal by extension
The AP technique is applied in separate regions surrounding a radar based on range and elevation scan.

The threshold of velocity and spectrum width below which reflectivity returns are designated as AP can be modified using an adaptable parameter set.
Removal By Extension

• An analysis window surrounding a single range data bin is constructed. A simple quotient (Q) of the number of non-AP data bins out of the total number being considered is computed.

• If Q >= 90%, invoke median filter
  (i.e. precipitation returns are smoothed)

• If Q < 90%, set range gate data value to AP
  * - this was found to be a crucial aspect of AP removal in Smalley and Bennett (2001)
KAMA – May 25, 1994

Product 96

Product 98

Product 98

Product 98m
IF( NUM_VALID_PNTS .GT. 1 ) THEN

C*** IF RATIO OF VALID POINTS (NON-CLUTTER) TO NUMBER OF POINTS (CLUTTER AND NON_CLUTTER) IS GREATER THAN THRESHOLD, FIND MEDIAN VALUE.
C

C

RATIO = FLOAT(NUM_VALID_PNTS)/NUM_PNTS
IF( RATIO .GE. ADPGDMEDIAN_L ) THEN

CALL A3148B__HEAP_SORT( POINTS, NUM_VALID_PNTS )
CALL A3148C__FIND_MEDIAN_VALUE( POINTS, NUM_VALID_PNTS, MEDIAN_VALUE )
ELSE

C*** NOT ENOUGH GOOD POINTS. SET REFLECTIVITY TO CLUTTER VALUE.
C

C

MEDIAN_VALUE = CLUTTER_FLAG
POST_FILTER( RNG_BIN, RADIAL ) = MEDIAN_VALUE
END IF

C

POST_FILTER( RNG_BIN, RADIAL ) = MEDIAN_VALUE
END IF