Mitigating Ground-Clutter Contamination on Polarimetric Doppler Weather Radars

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Abstract

- Automate the detection/removal of ground clutter contamination
- More important for polarimetric Doppler weather radars
- Ground clutter contamination can
  - Artificially inflate/deflate quantitative precipitation estimates
  - Adversely affect polarimetric classification algorithms
  - Obscure Doppler-velocity signatures of weather
- Miss-identified weather signals
  - Stratiform rain/snow events (most noticeable)
  - Exhibit similar clutter-characteristics as ground clutter contamination
  - Loss of data
- Dual-polarization information can assist in identification
  - More sensitive
  - More discriminating

Weather Environment Thresholding (WET)

Identifies dual polarimetric characteristics of weather signals to mitigate miss-identification as ground clutter

Performance: CLEAN-AP/WET

Differential Reflectivity ($Z_{dr}$)
Differential Phase ($\phi_{dp}$)
Correlation Coefficient ($\rho_{hv}$)

Ground clutter contamination still a prime concern for the weather radar community

Snow Event: WSR-88D in Duluth, MN

Ground clutter contamination seen after applying ground clutter mitigation
Data loss seen after applying ground clutter filter (No Detection)