

Gridded NEXRAD WSR-88D Radar Data **GridRad**

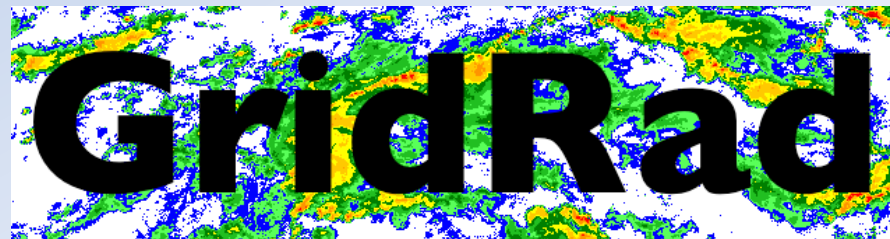
Pls:

Cameron Homeyer (chomeyer@ou.edu)

Ken Bowman (k-bowman@tamu.edu)

Data Collection/Creation Process

- GridRad data are large-area, three-dimensional mergers of S-band radar observations from the NEXRAD WSR-88D network
- GridRad data are made using a space- and time-weighted binning procedure. Multiple versions are available to the public (see <http://gridrad.org>)
- For DCOTSS, a special collection of v4.2 GridRad data at 10-min frequency for the entire CONUS are made for each deployment



Data Collection/Creation Process

- Each 10-min GridRad file contains volumes of radar reflectivity at horizontal polarization, velocity spectrum width, and details about the contributing radar observations used for QC
- Two additional GridRad-based data products are uniquely made for DCOTSS:
 - Overshoot identifications (based on combination of QC'd GridRad volumes and ERA5 reanalysis tropopause heights)
 - Overshoot trajectories (5-day forward trajectories from all overshoot locations) – these are also made for GOES overshoots

File Structure & Content

- All archived GridRad products are in netCDF-4 format
- GridRad volumes are written in a sparse format, as is true for all non-DCOTSS archives of the data
- Data are archived as daily .tar files that contain all 10-min volumes for a single day (12-16 GB per day), spanning 1 week prior to 1 day after the end of each deployment
- The GridRad data are made on a uniform longitude-latitude grid of 48 grid points per degree ($\sim 0.02^\circ$ spacing), with 0.5-km altitude spacing below 7 km AMSL and 1-km spacing above to 22 km AMSL

File Structure & Content Cont.

- Overshoots are grouped into a single netCDF file per day and include echo top altitudes and a binary (0/1) overshoot ID
 - Overshoots are identified if the 15-dBZ echo top altitude reaches at least 0.5 km above the ERA5 tropopause
- Overshoot trajectories are made at hourly intervals including all 10-min identifications in the hour, initialized in time at the midpoint (25 minutes past the hour) and advected 5 days forward
 - All trajectories are isentropic (i.e., advected by horizontal winds only along surfaces of constant potential temperature)
 - Trajectory positions are initialized every 0.5 km from the altitude of the tropopause to the echo top and saved at hourly intervals

Data Limitations & Considerations

- Errors in the native NEXRAD WSR-88D observations are typically <1 dB for reflectivity and <1 m/s for velocity spectrum width
- If all recommended QC techniques are applied, GridRad echo top altitudes are unbiased with an uncertainty of ± 1 km
- Artifacts may be present after QC, so care should be taken in interpreting the realism and significance of a GridRad storm depiction (especially in data sparse regions)
- More detail is available in the algorithm description document at <http://gridrad.org>

Tentative Archival Timeline

- Final 10-min GridRad volumes have already been made and archived and will appear to the public soon at the ASDC
- GridRad overshoot and forward trajectory files are currently in production and will be archived by end of February 2022

