

SPG Build 3 Training Hotline Meteorologists



- **Terminal Doppler Weather Radar Basics**
 - FAA radar designed to cover only its associated airport
 - 2 operational modes – both 6 minutes in duration
 - Monitor (VCP90) and Hazardous (VCP80)
 - Elevation angles are site dependent
 - Occasional non-operational modes
 - Calibration
 - Others?
 - Clutter filtering performed within 90 km and below approximately 10 degrees elevation

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- **TDWR Basics (continued)**
 - Base data is relative to magnetic north and adjusted to true north by the SPG
 - Spot blanking performed at some sites
 - SPG has no control over the TDWR RDA
 - C-band radar (5 cm wavelength)
 - 0.55 degree beam sampled every 1.0 degrees
 - Two VCPs, both are constructed from one long range scan followed by multiple short range scans, including one repeat cut (similar to MPDA)

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- Long Range Scan – 248 nmi* (460 km*)
 - Always the first elevation cut of a volume scan
 - Always at 0.6 degrees elevation angle
 - Reflectivity data only
 - Reflectivity data range is -30 to +80 dBZ
 - Low PRF
 - 150 meter range resolution close to radar, 300 meter range resolution beyond 135 km
 - NOTE: SPG combines the 150 meter data into 300 meter data by averaging the returned power of every two bins.
 - *LR reflectivity product display range is reduced to 225 nmi (416 km)
 - Data from this long range scan is used by TDWR in all subsequent short range scans of the volume for range ambiguity mitigation.
 - PRF selection
 - Setting of data quality flags

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- Short Range Scans – 48 nmi (90 km)
 - Used for all but the first elevation cut of a volume scan
 - Elevation angles vary by TDWR site
 - Reflectivity, Velocity and Spectrum Width
 - Reflectivity data range is -30 to +80 dBZ
 - Velocity data range is +/- 156 knots
 - Spectrum width data range is 0 to 10 m/sec
 - High PRF
 - 150 meter range resolution
 - Data truncated at 70,000 feet above radar level
 - Applicable above approximately 7 degrees elevation

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- VCP90 – Monitor Mode
 - Used when no significant weather is near the associated airport
 - 6-minutes to complete
 - Maximum elevation angle is 60 degrees at all sites
 - Minimum elevation angle varies by site with some as low as 0.1 degree
 - Most like a WSR-88D scanning strategy
 - After the 0.6 degree long range scan, 15 short range elevation scans are performed in sequence, low to high

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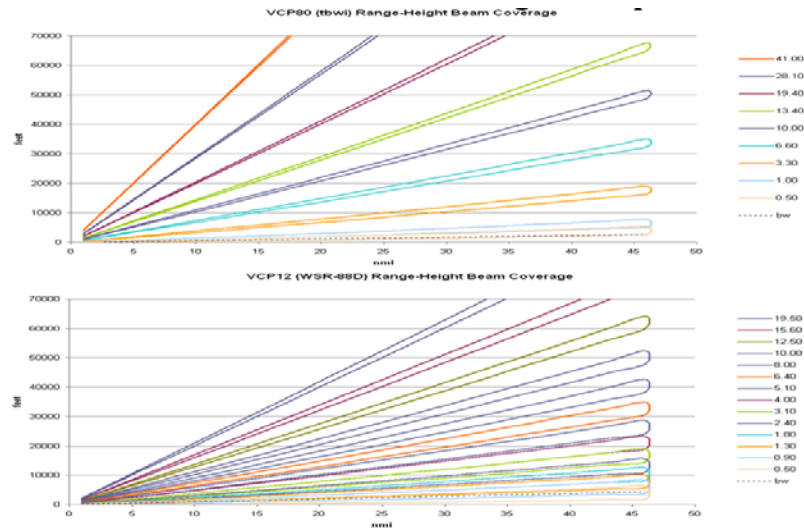
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- VCP80 – Hazardous Mode
 - Used when significant weather is near the associated airport
 - 6-minutes to complete
 - Maximum elevation angle varies by site from 60 degrees at Orlando to as low as 20.1 degrees at several sites
 - Minimum elevation angle varies by site with some as low as 0.1 degree
 - Most *unlike* a WSR-88D scanning strategy
 - After the 0.6 degree long range scan, 21 short range elevation scans are performed in a complex sequence:
 - lowest elevation scanned one per minute
 - third scan is performed only once
 - all remaining scans are performed every 3 minutes
 - 3-minute “mini-volume” technique by SPG for some algorithms

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TDWR vs. WSR-88D Volume Scan Coverage



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- SPG's Preprocessor (PPM) task performs the following:
 - Creates 88D-like base data radials from TDWR radials
 - Uses SNR threshold adaptable parameter to set data to below threshold (default 1.0 dB)
 - Interprets quality flags (possible RF) to set moment data to range folded
 - Sets short range scan reflectivity data (possible RF) to below threshold
 - No analogy to WSR-88D
 - Products sometimes have moving "holes"

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- SPG's Preprocessor (PPM) task functionality (continued):
 - Velocity is quantized from 0.25 m/s precision to 0.5 or 1.0 m/s by PPM, depending on adaptation data setting
 - Dealiased velocity data and TDWR Scans 2 & 3 merged based on adaptation data setting as follows:
 - "TDWR using cut 3"
 - Reflectivity from cut 2 and TDWR dealiased velocity from cut 3
 - "SPG using cut 3" (default)
 - Reflectivity from cut 2 and aliased velocity from cut 3 which is then dealiased by the SPG using the WSR-88D dealiasing algorithm
 - "SPG using cut 2"
 - Reflectivity from cut 2 and aliased velocity from cut 2 which is then dealiased by the SPG using the WSR-88D dealiasing algorithm
 - PRF of scan 3 is consistent with other surface scans.
 - Use of scan 2 can show data where other scans may be range folded, but time loops may appear jumpy

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- SPG's Preprocessor (PPM) task functionality (continued):
 - Sector Blanking
 - Sets status to enabled if TDWR base data reports it
 - Resets it to disabled if base data does not report it during a complete volume scan
 - Like RPG, SPG products report spot blanking if enabled
 - Forms RDA Status Message to emulate WSR-88D
 - Becomes TDWR Unit Status display on AWIPS
 - VCP change
 - Calibration Mode

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- SPG's Preprocessor (PPM) task functionality (continued):
 - Fills missing and “fat” radials caused by:
 - Missing: UDP packet loss
 - Poor quality FAA/WFO communication
 - SPG hardware glitch
 - Unusual SPG activity (e.g., base data compress & burn DVD)
 - Fat: Large delta azimuth, without packet loss
 - Cases
 - Single radials or sectors within an elevation.
 - Crossed elevation: PPM forms End-of-Elevation and Beg-of-Elevation
 - Skipped elevation: Lets downstream task PBD abort the volume scan
 - Mitigation to minimize volume scan aborts
 - PPM formed radial is blank except for bins at max range
 - Informs user of missing data and to distinguish from typical radar data problems (strokes, blockage, spot blanking, glitches)

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- Build 3 SPG Base Products
 - Reflectivity
 - 16 data level, 300 meter resolution, 225 nmi range
 - 256 data level, 300 meter resolution, 225 nmi range
 - 16 data level, 150 meter resolution, 48 nmi range
 - 256 data level, 150 meter resolution, 48 nmi range
 - Velocity
 - 16 data level, 150 meter resolution, 48 nmi range
 - 256 data level, 150 meter resolution, 48 nmi range
 - Spectrum Width
 - 8 data level, 150 meter resolution, 48 nmi range

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- Build 3 SPG Derived Products
 - Composite Reflectivity
 - VIL
 - Echo Tops
 - CR, VIL and ET
 - All products formats identical to WSR-88D versions except data range is 48 nmi
 - VCP90: 6-minute updates; includes all elevations
 - VCP80: 3-minute updates; includes all elevations in each mini-volume, reusing the first and third scans for the second mini-volume

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- Build 3 SPG Derived Products (continued)
 - Storm Tracking Information
 - Hail Index
 - Mesocyclone Detection
 - Tornadic Vortex Signature
 - STI, HI, MD, DMD and TVS
 - All product formats identical to WSR-88D versions except range is 48 nmi
 - VCP90: 6-minute updates; includes elevations below configurable elevation number
 - VCP80: 3-minute updates; includes elevations below configurable elevation number in each mini-volume, reusing the third scan for the second mini-volume

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- Build 3 SPG Products (continued)
 - Velocity Azimuth Display
 - VAD Wind Profile
 - VAD, VWP
 - All product formats identical to WSR-88D versions except maximum range is 48 nmi
 - VCP90: 6-minute updates; includes all elevations
 - VCP80: 6-minute updates; includes the last cut of each short range angle

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- Build 3 SPG Derived Products (continued)
 - User Selectable Layer Reflectivity
 - ULR
 - Product format identical to WSR-88D version except maximum range is 48 nmi
 - VCP90: 6-minute updates; includes all elevations
 - VCP80: 6-minute updates; includes all elevations

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- Build 3 SPG Derived Products (continued)
 - One-Hour Precipitation
 - Three-Hour Precipitation
 - Storm Total Precipitation
 - User Selectable Precipitation
 - Hybrid Scan Reflectivity
 - Digital Precipitation Array
 - Supplemental Precipitation Data
 - OHP, THP, STP, USP, DHR, HSR, DPA, SPD
 - All product formats are identical to WSR-88D versions
 - VCP90: 6-minute updates; **includes only the first elevation**
 - VCP80: 6-minute updates; **includes only the first elevation**
 - No REC due to heavy clutter filtering within 90 km by TDWR RDA
 - Data is power averaged from 300 meter to 1 km resolution
 - No blockage file used
 - Will use gage-bias if provided by AWIPS

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TDWR SPG Product / Algorithm Processing



| # | Angle | Angle | | VCP | | TDWR SPG (Product Time) | | | | | | | | |
|----------------------|-------|-------|------|------|------|-------------------------|------|------|------|------|------|------|------|------|
| | | Min | Max | 90 | 80 | 2200 | 2200 | 2206 | 2207 | 2208 | 2209 | 2210 | 2211 | 2212 |
| 25 | 60.0 | 57.6 | 62.5 | 60.0 | | | | | | | | | | |
| 24 | 55.0 | 52.6 | 57.5 | 55.1 | | | | | | | | | | |
| 23 | 50.0 | 47.6 | 52.5 | 50.2 | | | | | | | | | | |
| 22 | 45.0 | 42.6 | 47.5 | 45.3 | | | | | | | | | | |
| 21 | 40.0 | 37.6 | 42.5 | 40.4 | 42.0 | | | | | | | | | |
| 20 | 35.0 | 32.6 | 37.5 | 35.5 | | | | | | | | | | |
| 19 | 30.0 | 27.6 | 32.5 | 30.6 | 28.1 | | | | | | | | | |
| 18 | 25.0 | 22.1 | 27.5 | 25.7 | | | | | | | | | | |
| 17 | 19.5 | 18.0 | 22.0 | 20.8 | 19.4 | | | | | | | | | |
| 16 | 16.7 | 15.7 | 17.9 | 15.9 | | | | | | | | | | |
| 15 | 14.0 | 13.1 | 15.6 | | 13.4 | | | | | | | | | |
| 13 | 10.0 | 9.6 | 11.0 | 11.0 | 10.0 | | | | | | | | | |
| 10 | 6.0 | 5.7 | 6.6 | 6.1 | 6.6 | | | | | | | | | |
| 7 | 3.4 | 2.7 | 3.6 | 3.3 | 3.3 | | | | | | | | | |
| 3 | 0.9 | 0.8 | 1.1 | 1.0 | 1.0 | | | | | | | | | |
| 2 | 0.5 | 0.4 | 0.8 | 0.6 | 0.6 | | | | | | | | | |
| 2 | 0.5 | 0.4 | 0.8 | 0.5 | 0.5 | | | | | | | | | |
| AWIPS Binning Scheme | | bwi | | 90 | | 80 | | | | | | | | |
| tbwi example | | VNUM | | 1 | | 2 | | | | | | | | |

Algorithms/Products run on scans as indicated by cell side boarder (1 per 6 minute PPS, ULR, VWP), top (derived mini-vol), and patterns (storm analysis mini-volume).

- PPS: Long Range Cut
- VWP: Last Cut of Each Short Range Angle
- ULR: Every Cut
- STI, HI, MD, TVS, cat: Cut #'s as noted & reuse 1.0 deg cut
- CR, VIL, ET: Cut #'s as noted & reuse 1.0 deg and Long Range cut

Product Times (top) of Base Product Elevation Cuts indicated by cell color

10/14/2008
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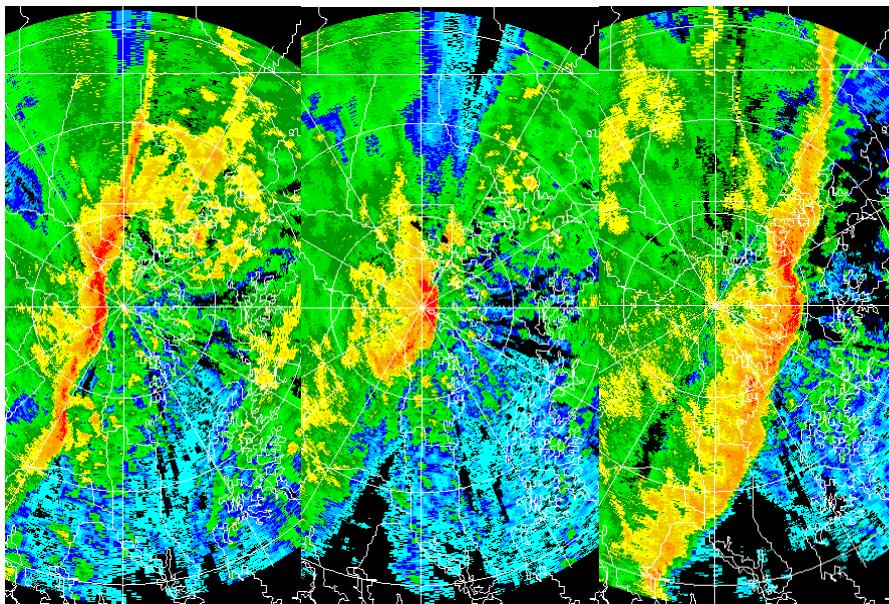
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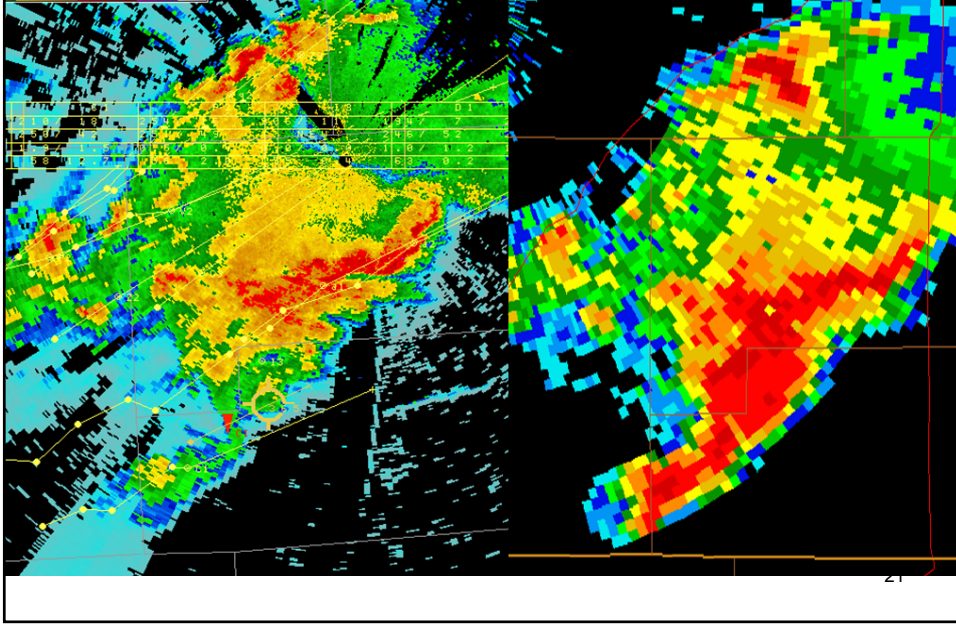
- TDWR Data Quality Issues
 - Attenuation
 - Range unfolding
 - Velocity dealiasing errors
 - Elevation-dependent noise correction
 - Clutter filter effects
 - Data shift
 - Data availability
 - Interference
 - Wind farms

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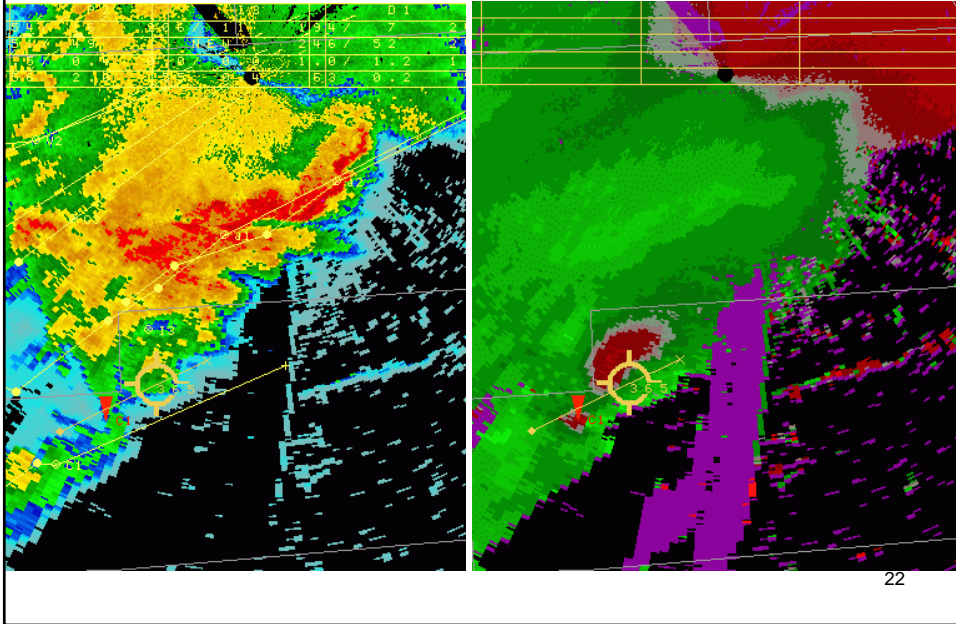
Attenuation – Impacting Squall Line

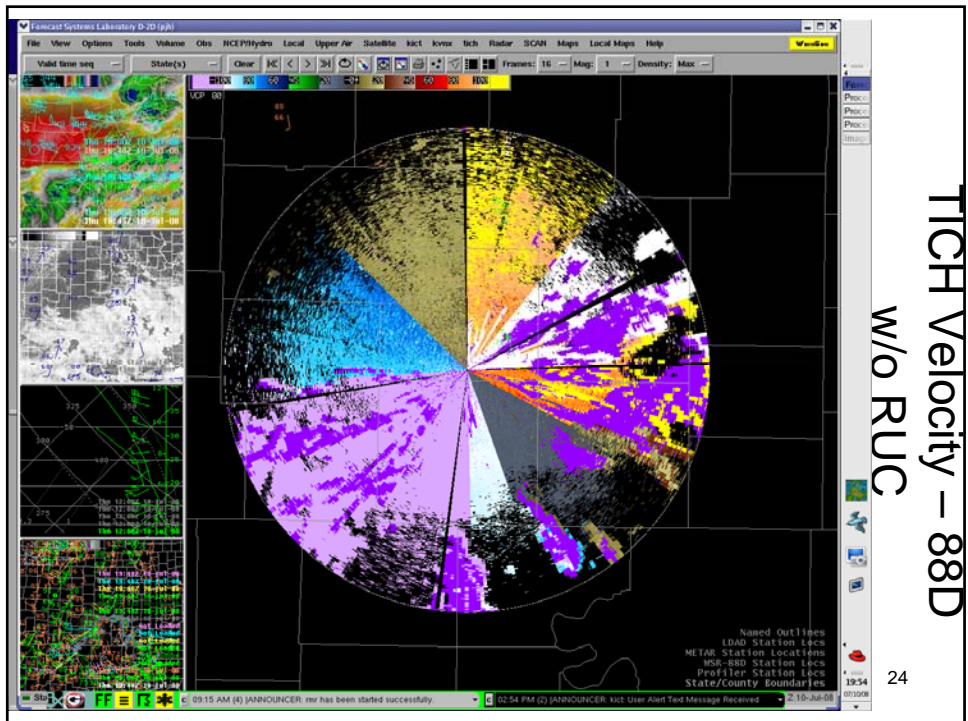
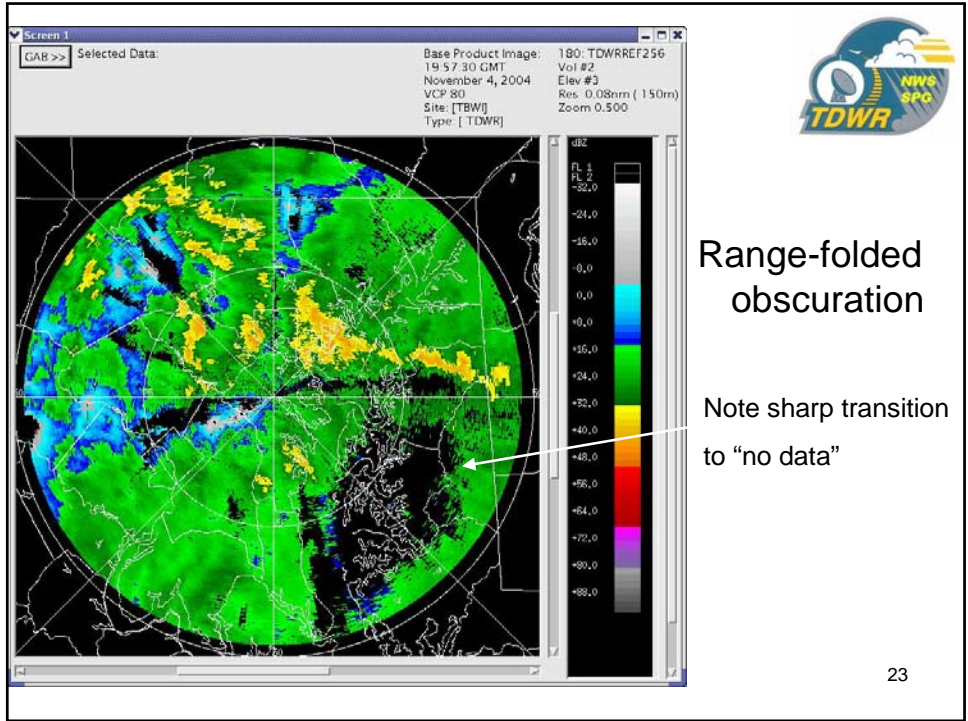


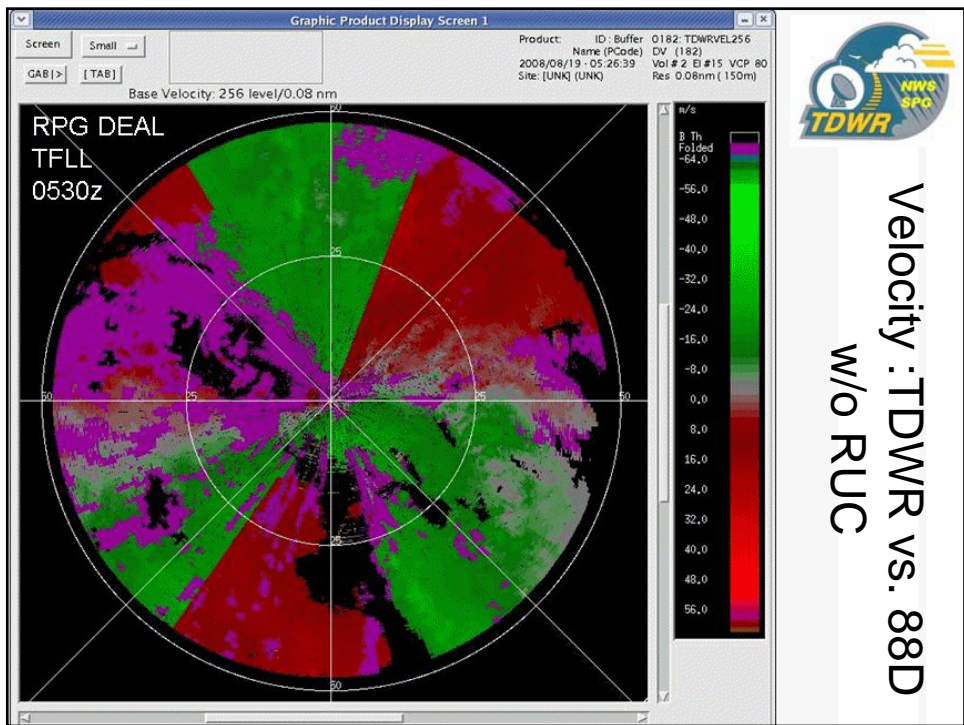
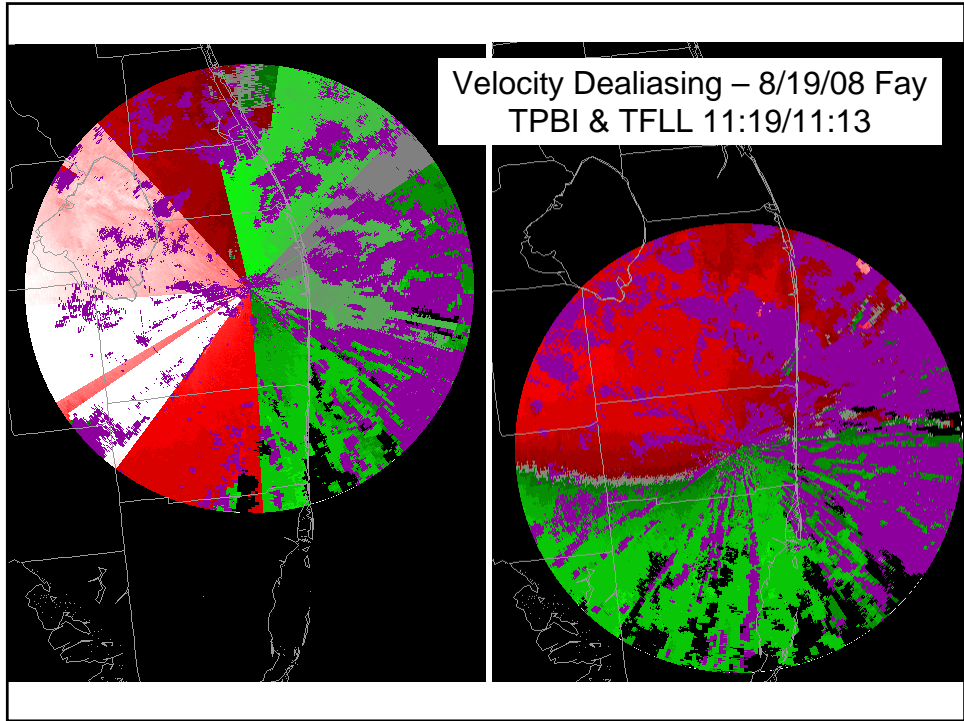
Attenuation – Impacting Supercell



Attenuation – Impacting Supercell





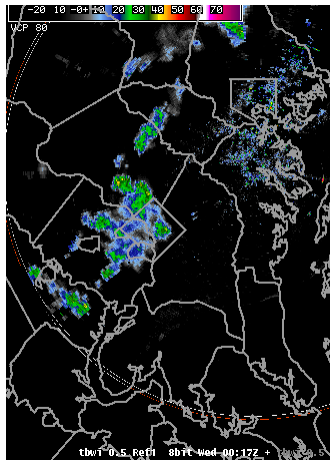


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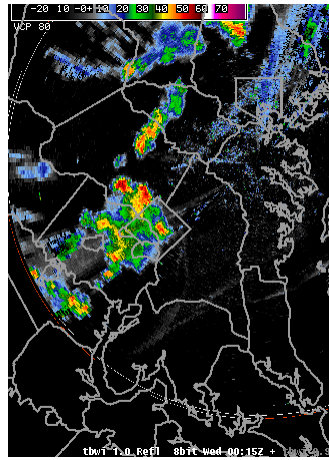


Elevation-Dependent Noise Correction

tbwi 0.5 degrees



tbwi 1.0 degrees



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Forecast Systems Laboratory D-20 (32x)

File View Options Tools Volume Obs NCEP/Hydrad Local Upper Air Satellite kdwz tbwi tjfk kort Radar SCAN Maps Help

Valid time seq WFO Clear [Left Arrow] [Right Arrow] [Refresh] [Zoom In] [Zoom Out] [Density: 1]

Mon 20:00Z tbwi 0.5 Refl 8bkt wed-00:17Z +

Mon 20:00Z 10 Jun-08

Mon 20:00Z 15 Jun-08

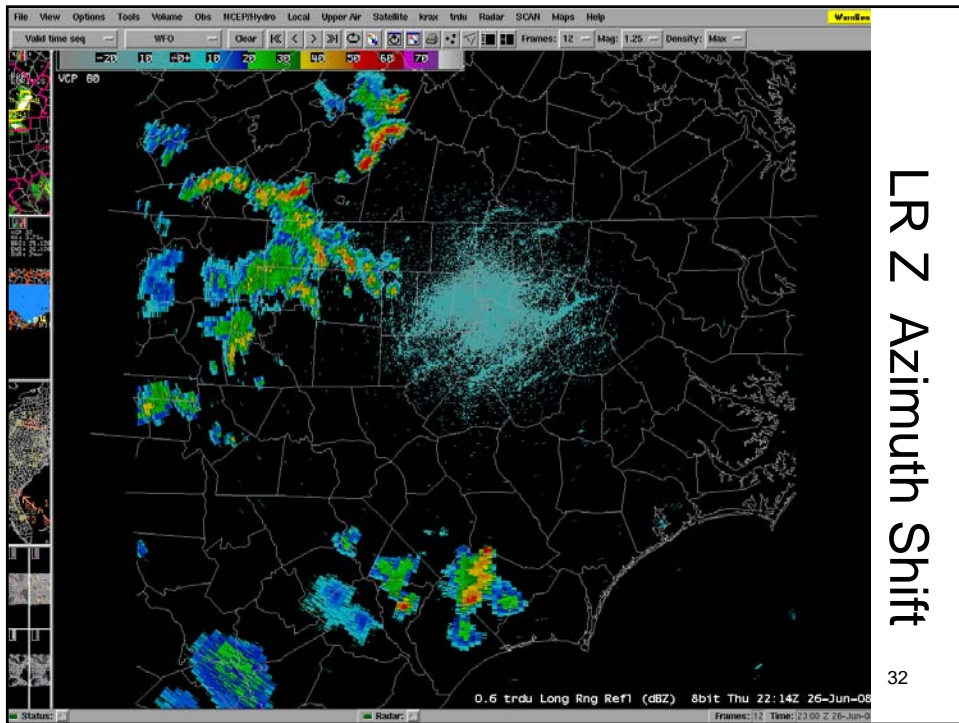
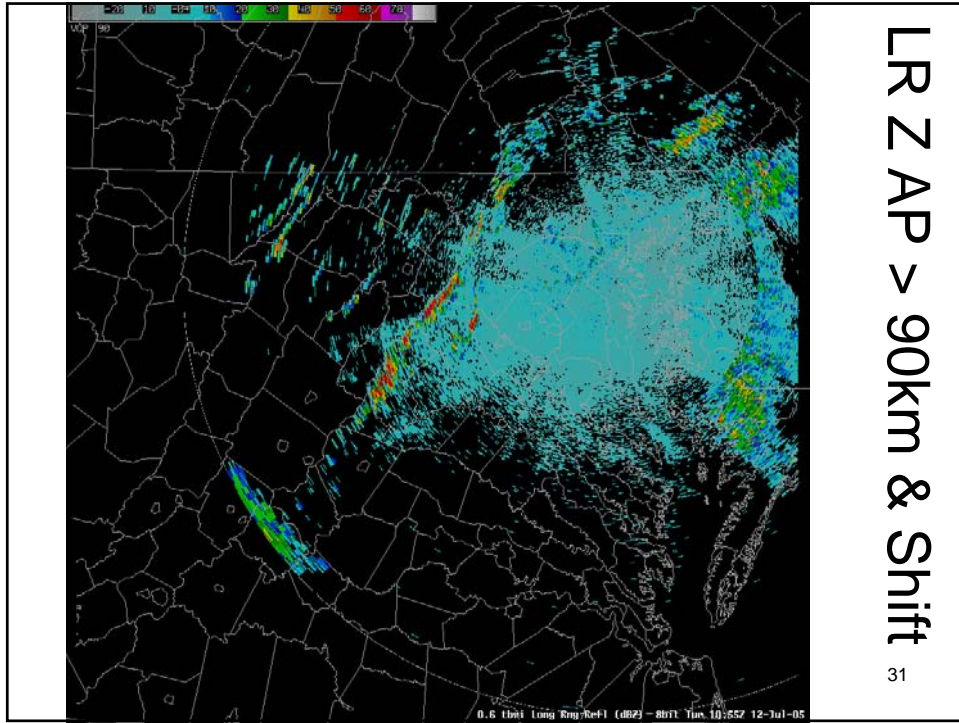
Mon 20:00Z 15 Jun-08

Mon 20:00Z 15 Jun-08

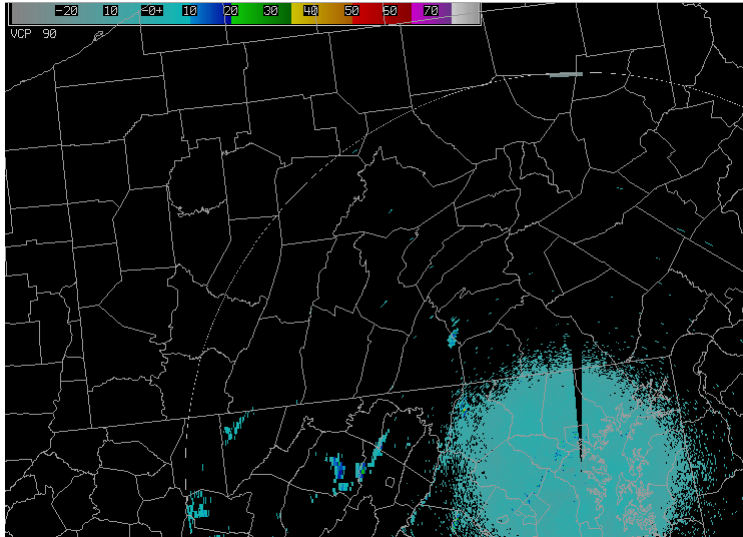
Bad noise correction TBWI

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© 11:14 AM (4) JANNOUNCER: of has been started successfully. [Taskbar icons]

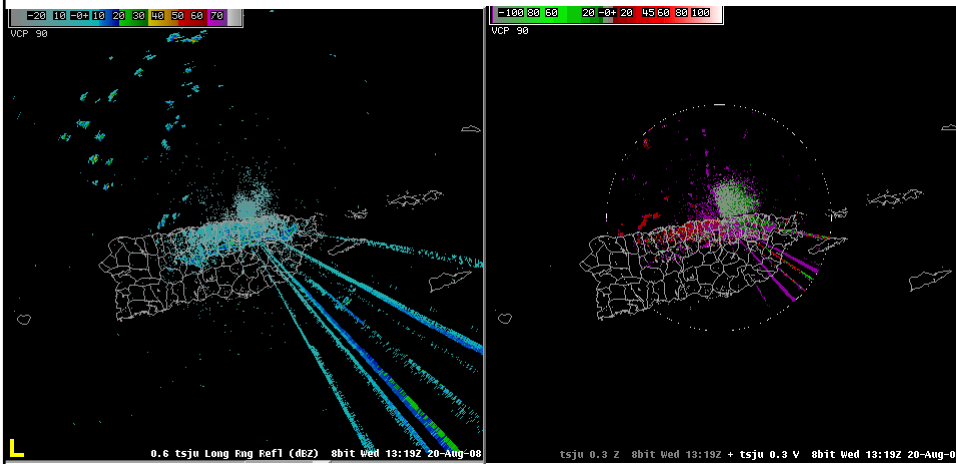


SPG Build 3 Training Hotline Meteorologists



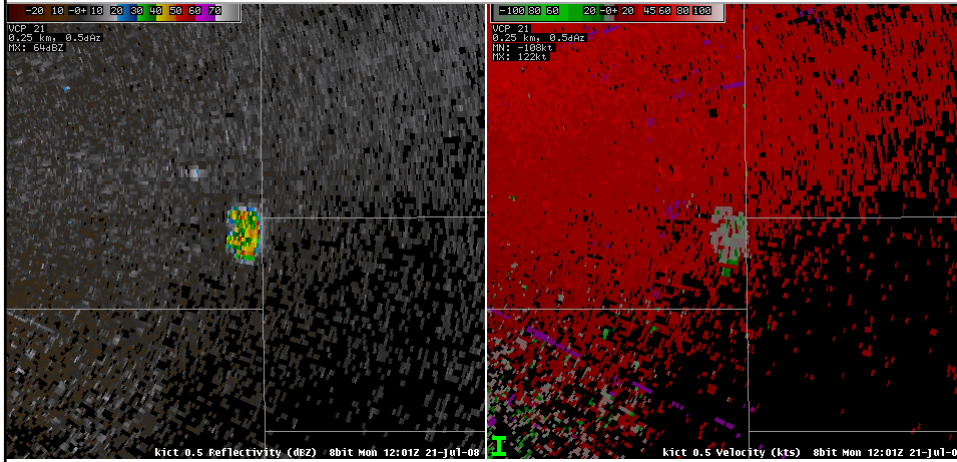
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SPG Build 3 Training TSJU Interference



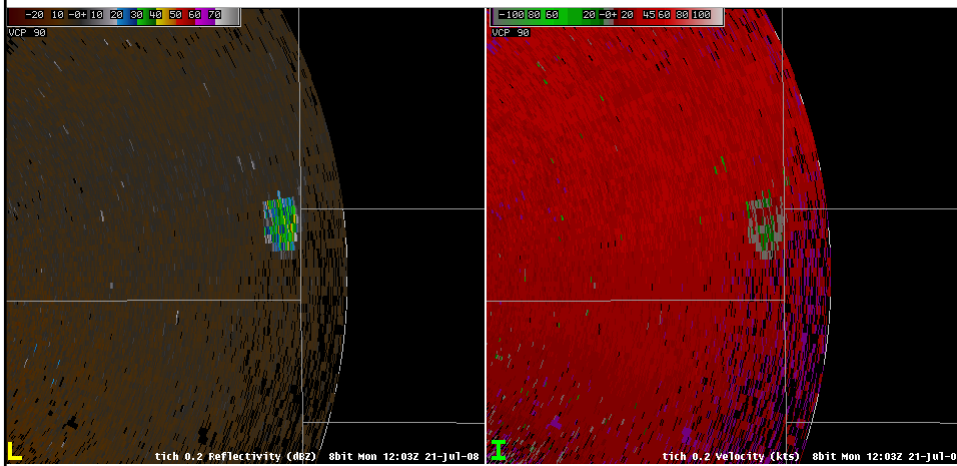
34

SPG Build 3 Training KICT Wind Farm



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SPG Build 3 Training TICT Wind Farm



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TDWR SPG Products RPCCDS & SBN/NOAAPORT



| # | NNN | WMO | Radar Prod Code | Radar Product Name | Kbytes | Frequency | NWSTG Distribution | NWSTG RPCCDS FTP Dir Name |
|----|-----|--------|-----------------|--|--------|-----------|--------------------|---------------------------|
| 1 | GSM | NXUS6i | 2 | General Status Message(GSM) | 0.1 | - 5/day | RPCCDS & SBN | DS.p2gsm |
| 2 | FTM | NOUS6i | 75 | Free Text Message(FTM) | 0.3 | < 1/day | RPCCDS & SBN | DS.75ftm |
| 3 | RSL | SDUS4i | 152 | Archive Status Product(ASP) | 3 | 3/day | RPCCDS & SBN | DS.152rs |
| 4 | TZL | SDUS5i | 186 | Reflectivity (Z) - 0.6 deg Long Range - 8bit | 80 | 10/hr | RPCCDS & SBN | DS.186zl |
| 5 | TR0 | SDUS5i | 181 | Reflectivity (Z) - Lowest elev - 4bit | 25 | 10/hr | RPCCDS & SBN | DS.181r0 |
| 6 | TR1 | SDUS2i | 181 | Reflectivity (Z) - 1.0 deg - 4bit | 14 | 10/hr | RPCCDS & SBN | DS.181r1 |
| 7 | TR2 | SDUS2i | 181 | Reflectivity (Z) - 3rd elev - 4bit | 12 | 10/hr | RPCCDS & SBN | DS.181r2 |
| 8 | TV0 | SDUS5i | 182 | Velocity (V) - Lowest elev - 8bit | 90 | 10/hr | RPCCDS & SBN | DS.182v0 |
| 9 | TV1 | SDUS7i | 182 | Velocity (V) - 1.0 deg - 8bit | 70 | 10/hr | RPCCDS & SBN | DS.182v1 |
| 10 | TV2 | SDUS7i | 182 | Velocity (V) - 3rd elev - 8bit | 45 | 10/hr | RPCCDS & SBN | DS.182v2 |
| 11 | NCR | SDUS5i | 37 | Composite Ref (CZ) | 20 | 10/hr | RPCCDS & SBN | DS.p37cr |
| 12 | NET | SDUS7i | 41 | Echo Tops (ET) | 1.5 | 10/hr | RPCCDS & SBN | DS.p41et |
| 13 | NVW | SDUS3i | 48 | VAD Wind Profile (VWP) | 7.5 | 10/hr | RPCCDS & SBN | DS.48vwp |
| 14 | NVL | SDUS5i | 57 | Vert Integ Liq (VIL) | 1.3 | 10/hr | RPCCDS & SBN | DS.57vil |
| 15 | NST | SDUS6i | 58 | Storm Tracking Information (STI) | 3.5 | 10/hr | RPCCDS | DS.58sti |
| 16 | NHI | SDUS6i | 59 | Hail Index (HI) | 3.2 | 10/hr | RPCCDS | DS.p59hi |
| 17 | NTV | SDUS6i | 61 | Tornadoic Vortex Signature (TVS) | 2.1 | 10/hr | RPCCDS | DS.61tvs |
| 18 | N1P | SDUS3i | 78 | One Hour Precip (OHP) | 10 | 10/hr | RPCCDS & SBN | DS.78ohp |
| 19 | NTP | SDUS5i | 80 | Storm Total Precip (STP) | 11 | 10/hr | RPCCDS & SBN | DS.80stp |
| 20 | DPA | SDUS8i | 81 | Digital Precip Array (DPA) | 7 | 10/hr | RPCCDS & SBN | DS.81dpr |
| 21 | SPD | SDUS6i | 82 | Supplemental Precipitation Data (SPD) | 2.8 | 10/hr | RPCCDS | DS.82spd |
| 22 | DHR | SDUS5i | 32 | Digital Hybrid Scan Refl (DHR) | 32 | 10/hr | RPCCDS & SBN | DS.32dhr |
| 23 | DSP | SDUS5i | 138 | Digital Storm Total Precip (STP) | 15 | 10/hr | RPCCDS & SBN | DS.138dp |
| 24 | NMD | SDUS3i | 141 | Mesocyclone (MD) | 2 | 10/hr | RPCCDS & SBN | DS.141md |

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TDWR SPG Sites RPCCDS & SBN/NOAAPORT



| WFO # | SPGs @ wfo | Sending WFO ID CCCC | TDWR SPG ID xxx | TDWR SPG ID | Radar FTP Site directory | SPG # | WFO # | SPGs @ wfo | Sending WFO ID CCCC | TDWR SPG ID xxx | TDWR SPG ID | Radar FTP Site directory | SPG # |
|-------|------------|---------------------|-----------------|-------------|--------------------------|-------|-------|------------|---------------------|-----------------|-------------|--------------------------|-------|
| 1 | 1 | KBOU | DEN | 3013 | Sl.tden | 1 | 17 | 4 | KLWX | ADW | 3001 | Sl.tadw | 22 |
| 2 | 1 | KBOX | BOS | 3004 | Sl.tbos | 2 | | | KLWX | BWI | 3005 | Sl.tbwi | 23 |
| 3 | 1 | KCLE | LVE | 3006 | Sl.tlve | 3 | | | KLWX | DCA | 3012 | Sl.tdca | 24 |
| 4 | 1 | KDTX | DTW | 3015 | Sl.tdtw | 4 | | | KLWX | IAD | 3019 | Sl.tiad | 25 |
| 5 | 1 | KEAX | MCI | 3025 | Sl.tmci | 5 | 18 | 1 | KMEG | MEM | 3028 | Sl.tmem | 26 |
| 6 | 1 | KFFC | ATL | 3002 | Sl.tatl | 6 | | | KMFL | FLL | 3017 | Sl.tflil | 27 |
| 7 | 2 | KFWD | DAL | 3010 | Sl.tdal | 7 | 19 | 3 | KMFL | MIA | 3029 | Sl.tmia | 28 |
| 8 | 1 | KFWD | DFW | 3014 | Sl.tdfw | 8 | | | KMFL | PBI | 3035 | Sl.tpbi | 29 |
| 8 | 1 | KGSP | CLT | 3007 | Sl.tclt | 9 | 20 | 1 | KMKX | MKE | 3030 | Sl.tmke | 30 |
| 9 | 2 | KHGX | HOU | 3018 | Sl.thou | 10 | 21 | 1 | KMLB | MCO | 3026 | Sl.tmco | 31 |
| 9 | 2 | KHGX | IAH | 3020 | Sl.tiah | 11 | 22 | 1 | KMPX | MSP | 3031 | Sl.tmsp | 32 |
| 10 | 1 | KICT | ICH | 3021 | Sl.tich | 12 | 23 | 1 | KOHX | BNA | 3003 | Sl.tbna | 33 |
| 11 | 3 | KILN | CMH | 3008 | Sl.tcmh | 13 | 24 | 2 | KOKX | EWR | 3016 | Sl.tewr | 34 |
| | | KILN | CVG | 3009 | Sl.tcvg | 14 | | | KOKX | JFK | 3023 | Sl.tjfk | 35 |
| | | KILN | DAY | 3011 | Sl.tday | 15 | 25 | 1 | KOUN | OKC | 3033 | Sl.tokc | 36 |
| 12 | 1 | KIND | IDS | 3022 | Sl.tids | 16 | 26 | 1 | KPBZ | PIT | 3038 | Sl.tpit | 37 |
| 13 | 1 | KLIX | MSY | 3032 | Sl.tmsy | 17 | 27 | 1 | KPHI | PHL | 3036 | Sl.tphl | 38 |
| 14 | 1 | KLMK | SDF | 3040 | Sl.tsdw | 18 | 28 | 1 | KPSR | PHX | 3037 | Sl.tphx | 39 |
| 15 | 2 | KLOT | MDW | 3027 | Sl.tmdw | 19 | 29 | 1 | KRAH | RDU | 3039 | Sl.trdu | 40 |
| | | KLOT | ORD | 3034 | Sl.tord | 20 | 30 | 1 | KSLC | SLC | 3042 | Sl.tslc | 41 |
| 16 | 1 | KLSX | STL | 3043 | Sl.tstl | 21 | 31 | 1 | KTBW | TPA | 3044 | Sl.ttpa | 42 |
| | | | | | | | 32 | 1 | KTSA | TUL | 3045 | Sl.ttul | 43 |
| | | | | | | | 33 | 1 | KVEF | LAS | 3024 | Sl.tlas | 44 |
| | | | | | | | 34 | 1 | TJSJ | SJU | 3041 | Sl.tsjj | 45 |

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| TDWR SPG Radar Product Central Collection and Distribution | | | | | | | | | | | | | | Version: May 22, 2008 | | mji | |
|--|----|----------------|-------------|------------|------------------|--------|-----|----|---------------------------------------|--------------|-------------|---------------------|-----------------------------|--------------------------|----|-----|--|
| SPG @ WFO | # | Sending WFO ID | TDWR SPG ID | WMO header | Product category | RPCCDS | SBN | # | Product Name | Product Code | Size Kbytes | Elevation (*Varies) | Radar FTP product directory | Radar FTP Site directory | # | | |
| 1 | 1 | KBOU | DEN | NXUS61 | GSM | Y | Y | 1 | General Status Message(GSM)* | 2 | 0.1 | 0 | DS.p2gsm | SL.tadw | 1 | | |
| 1 | 2 | KBOU | BOS | NOUS61 | FTM | Y | Y | 2 | Free Text Message(FTM)* | 75 | 0.75 | 0 | DS.75ftm | SL.tatf | 2 | | |
| 1 | 3 | KCLE | LVE | SDUS41 | RSI | Y | Y | 3 | Archive Status Product(ASP)* | 152 | 3 | 0 | DS.152rs | SL.tbna | 3 | | |
| 1 | 4 | KDTX | DTW | SDUS51 | SLZL | Y | Y | 4 | Reflectivity (Z) - 8bit | 186 | 80 | 0.6 | DS.186z | SL.tbos | 4 | | |
| 1 | 5 | KEAX | MCI | SDUS51 | TR0 | Y | Y | 5 | Reflectivity (Z) - 4bit | 181 | 25 | base* | DS.181r0 | SL.tbwi | 5 | | |
| 1 | 6 | KFFC | ATL | SDUS21 | TR1 | Y | Y | 6 | Reflectivity (Z) - 4bit | 181 | 14 | 1.0 | DS.181r1 | SL.tctf | 6 | | |
| 2 | 7 | KFWD | DAL | SDUS21 | TR2 | Y | Y | 7 | Reflectivity (Z) - 4bit | 181 | 12 | thrd* | DS.181r2 | SL.tcmh | 7 | | |
| 2 | 7 | KFWD | DFW | SDUS51 | TV0 | Y | Y | 8 | Velocity (V) - 8bit | 182 | 90 | base* | DS.182v0 | SL.tcvj | 8 | | |
| 1 | 8 | KGSP | CLT | SDUS71 | TV1 | Y | Y | 9 | Velocity (V) - 8bit | 182 | 70 | 1.0 | DS.182v1 | SL.tdal | 9 | | |
| 2 | 9 | KHGX | HOU | SDUS71 | TV2 | Y | Y | 10 | Velocity (V) - 8bit | 182 | 45 | thrd* | DS.182v2 | SL.tday | 10 | | |
| 9 | 9 | KHGX | IAH | SDUS51 | INCR | Y | Y | 11 | Composite Ref. (CZ) | 37 | 20 | -1 | DS.p37cz | SL.tdca | 11 | | |
| 1 | 10 | KICT | ICH | SDUS71 | NET | Y | Y | 12 | Echo Tops (ET) | 41 | 1.5 | -1 | DS.p41et | SL.tden | 12 | | |
| 1 | 11 | KILN | CMH | SDUS31 | NVW | Y | Y | 13 | VAD Wind Profile (VWP) | 48 | 7.5 | -1 | DS.48vwp | SL.tdhw | 13 | | |
| 3 | 11 | KILN | CVG | SDUS51 | NVL | Y | Y | 14 | Vert Inted Lig (VIL) | 57 | 1.3 | -1 | DS.57vil | SL.tdhw | 14 | | |
| 1 | 11 | KILN | DAY | SDUS61 | INST | Y | Y | 15 | Storm Tracking Information (STI) | 58 | 3.5 | -1 | DS.58sti | SL.tsew | 15 | | |
| 1 | 12 | KIND | IDS | SDUS61 | INH1 | Y | Y | 16 | Hail Index (HI) | 59 | 3.2 | -1 | DS.p59hi | SL.tfil | 16 | | |
| 1 | 13 | KLIX | MSY | SDUS61 | INTV | Y | Y | 17 | Tornadoic Vortex Signature (TVS) | 61 | 2.1 | -1 | DS.61tvs | SL.thou | 17 | | |
| 1 | 14 | KLMK | SDF | SDUS31 | N1P | Y | Y | 18 | One Hour Precp. (OHP) | 78 | 10 | -1 | DS.78ohp | SL.tiad | 18 | | |
| 2 | 15 | KLOT | MDW | SDUS51 | N1P | Y | Y | 19 | Storm Total Precp (STP) | 80 | 11 | -1 | DS.80stp | SL.tiah | 19 | | |
| 15 | 15 | KLOT | ORD | SDUS81 | DPA | Y | Y | 20 | Digital Precip. Array (DPA) | 81 | 7 | -1 | DS.81dpr | SL.tich | 20 | | |
| 1 | 16 | KLSX | STL | SDUS61 | SPD | Y | Y | 21 | Supplemental Precipitation Data (SPD) | 82 | 2.8 | -1 | DS.82spd | SL.tida | 21 | | |
| 1 | 17 | KLWX | ADW | SDUS51 | DHR | Y | Y | 22 | Digital Hybrid Scan Refl (DHR) | 32 | 32 | -1 | DS.32dhr | SL.tjfk | 22 | | |
| 4 | 17 | KLWX | BWI | SDUS51 | DSP | Y | Y | 23 | Digital Storm Total Precp (STP) | 138 | 15 | -1 | DS.138dtp | SL.tlas | 23 | | |
| 17 | 17 | KLWX | DCA | SDUS31 | MND | Y | Y | 24 | Mesocyclone (MD) | 141 | 2 | -1 | DS.141md | SL.tlve | 24 | | |
| 17 | 17 | KLWX | IAD | | | | | | | | | | SL.tlnci | 25 | | | |
| 1 | 18 | KMEG | MEM | | | | | | | | | | SL.tlnco | 26 | | | |
| 1 | 19 | KMFL | FLL | | | | | | | | | | SL.tlndw | 27 | | | |
| 3 | 19 | KMFL | MIA | | | | | | | | | | SL.tlmem | 28 | | | |
| 1 | 19 | KMFL | PBI | | | | | | | | | | SL.tlmla | 29 | | | |
| 1 | 20 | KMKX | MIKE | | | | | | | | | | SL.tlmke | 30 | | | |
| 1 | 21 | KMLB | MCO | | | | | | | | | | SL.tlmsp | 31 | | | |
| 1 | 21 | KMPX | MSP | | | | | | | | | | SL.tlmsy | 32 | | | |
| 1 | 23 | KOHX | BNA | | | | | | | | | | SL.ttokc | 33 | | | |
| 2 | 24 | KOKX | EWR | | | | | | | | | | SL.tlord | 34 | | | |
| 1 | 24 | KOKX | JFK | | | | | | | | | | SL.tlpbi | 35 | | | |
| 1 | 25 | KOUN | OKC | | | | | | | | | | SL.tlphi | 36 | | | |
| 1 | 26 | KPBZ | PIT | | | | | | | | | | SL.tlphx | 37 | | | |
| 1 | 27 | KPHI | PHL | | | | | | | | | | SL.tlphi | 38 | | | |
| 1 | 28 | KPSR | PHX | | | | | | | | | | SL.tlphx | 39 | | | |
| 1 | 29 | KRAH | RDU | | | | | | | | | | SL.tlphf | 40 | | | |
| 1 | 30 | KRSJ | SJU | | | | | | | | | | SL.tlsju | 41 | | | |
| 1 | 31 | KSLC | SLC | | | | | | | | | | SL.tlslc | 42 | | | |
| 1 | 32 | KTBW | TPA | | | | | | | | | | SL.tltpa | 43 | | | |
| 1 | 33 | KTSA | TUL | | | | | | | | | | SL.tltpa | 44 | | | |
| 1 | 34 | KVEF | LAS | | | | | | | | | | SL.tltul | 45 | | | |

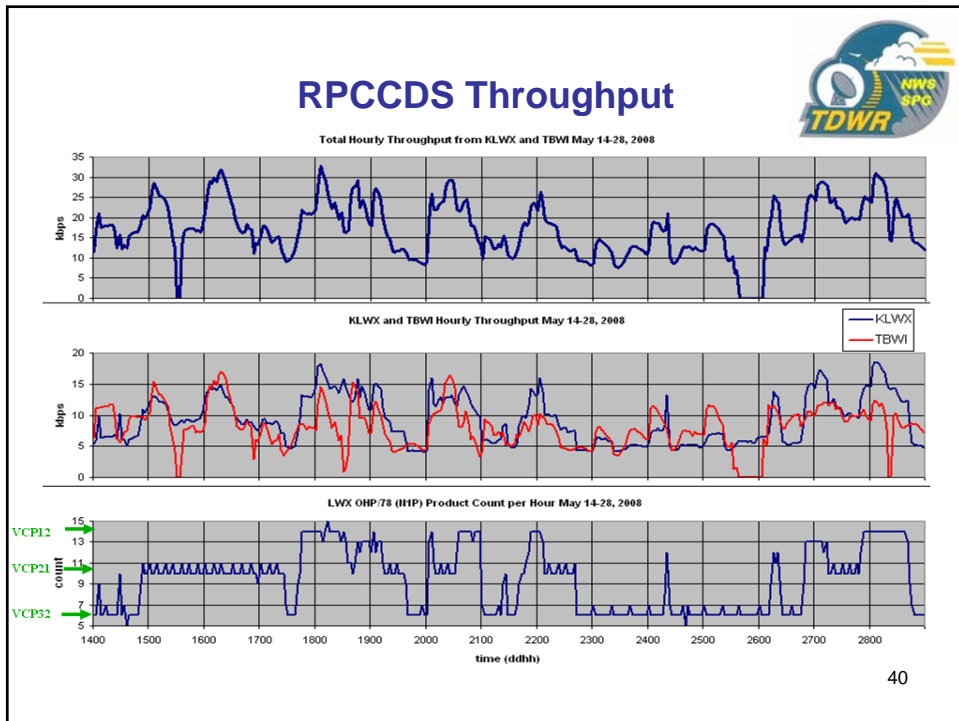
Total KBytes per volume scan : 459

Throughput Kbps (6 min volume scan) : 10

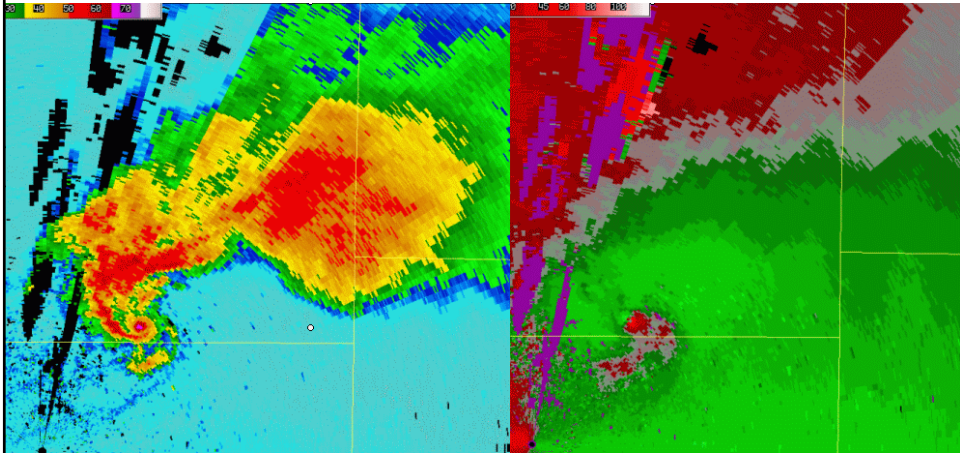
same as 88D
approved SPG TDWR-centric
unresolved 88d name issue

Example of ASP from KTLX via OUN:
SDUS44 KOUN 310754
RSLLTX

TTUSII CCCC ddhhmm NNNxxx
where dd is day of month, hhmm is volume scan time

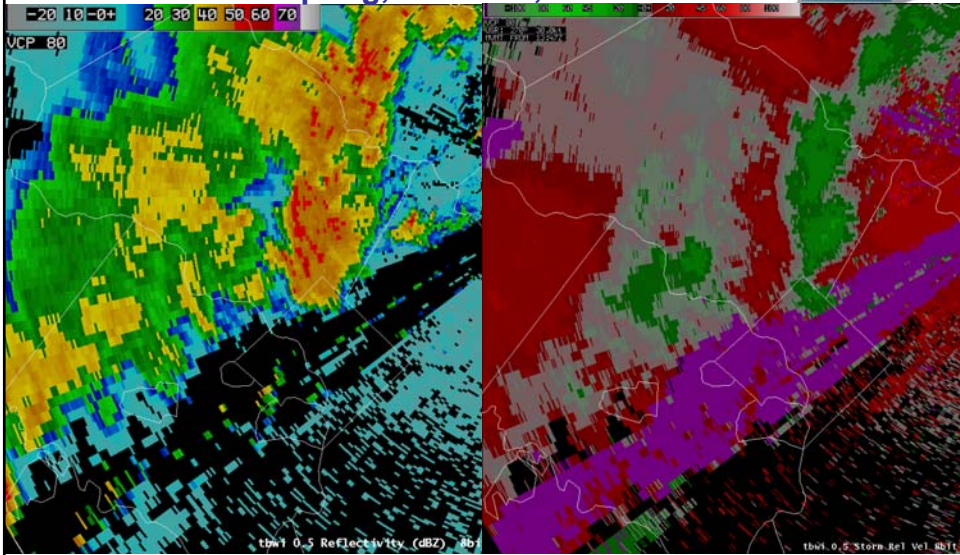


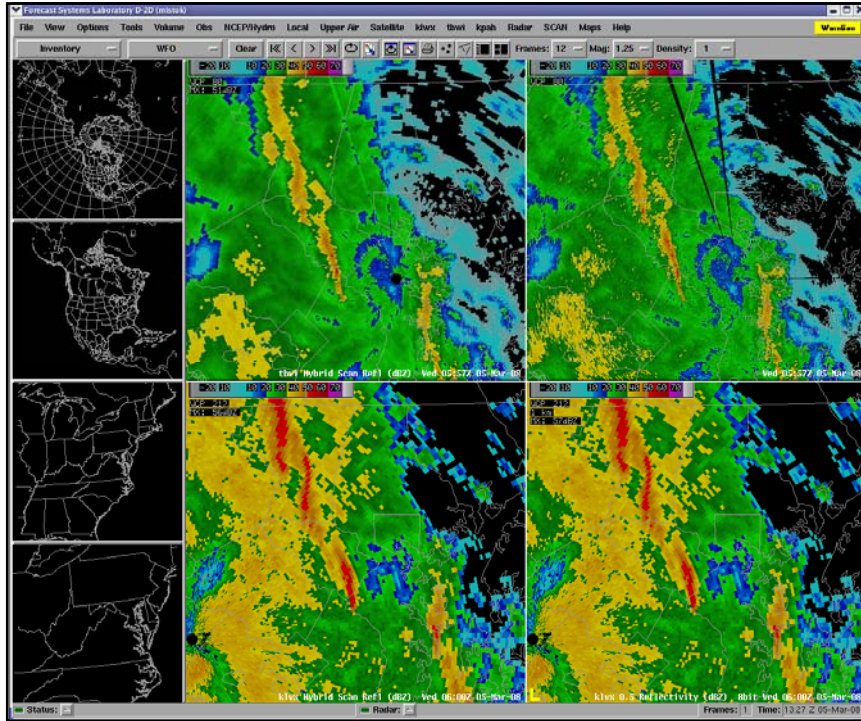
TDWR SPG Product Examples Moore, OK



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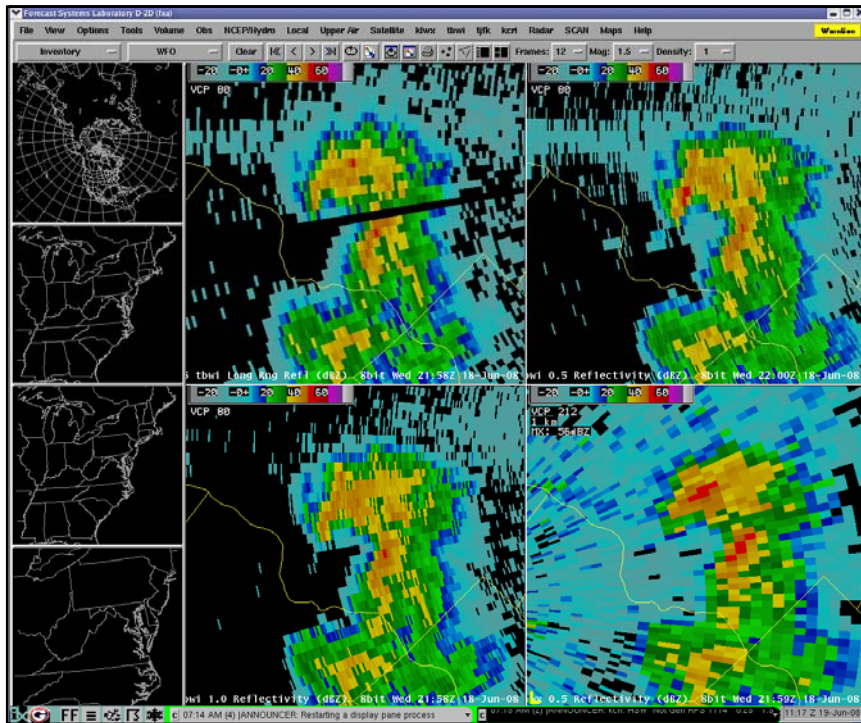
TBWI July 27, 2005 Wind Report “Many trees and power lines down in Silver Spring, Wheaton, Takoma Park”





Similar Z/DHR TBWI vs. KLWX

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Similar Z TBWI vs. KLWX

44

