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                LPVEX10 WCR Processed Data Directory Catalog
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Directory (flight number)
Total Size                FileDescriptors
Comment
Size File                Beg_End Time   RadMode-Ants      Ants:
                        up beam
                        down_aft beam
                        beam

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sep16 (rf01):
total 3.5 GB

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508M WCR.LPVEX10.20100916.074441_080800.CPP-H1H2V2.nc
651M WCR.LPVEX10.20100916.080801_083758.CPP-H1H2V2.nc
613M WCR.LPVEX10.20100916.084332_091142.CPP-H1H2V2.nc
534M WCR.LPVEX10.20100916.091143_093615.CPP-H1H2V2.nc
632M WCR.LPVEX10.20100916.093616_100519.CPP-H1H2V2.nc
575M WCR.LPVEX10.20100916.101557_104223.CPP-H1H2V2.nc

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sep18 (rf02)

aircraft problem, mission aborted; no data

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sep19 (rf03):
total 3.8 GB

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515M WCR.LPVEX10.20100919.064844_072229.CPP-H1V2.nc
350M WCR.LPVEX10.20100919.072230_074528.CPP-H1V2.nc
577M WCR.LPVEX10.20100919.074908_082659.CPP-H1V2.nc
342M WCR.LPVEX10.20100919.082700_084926.CPP-H1V2.nc
7.8M WCR.LPVEX10.20100919.085236_085307.CPP-H1V2.nc
637M WCR.LPVEX10.20100919.085309_092225.CPP-H1H2V2.nc
504M WCR.LPVEX10.20100919.092226_094536.CPP-H1H2V2.nc
873M WCR.LPVEX10.20100919.094538_102545.CPP-H1H2V2.nc

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sep21 (rf04):
total 4.6 GB

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614M WCR.LPVEX10.20100921.080434\_083246.CPP-H1H2V2.nc  
818M WCR.LPVEX10.20100921.083603\_091339.CPP-H1H2V2.nc  
836M WCR.LPVEX10.20100921.091340\_095207.CPP-H1H2V2.nc  
576M WCR.LPVEX10.20100921.095500\_102129.CPP-H1H2V2.nc  
805M WCR.LPVEX10.20100921.102130\_105831.CPP-H1H2V2.nc  
214M WCR.LPVEX10.20100921.105833\_110821.CPP-H1H2V2.nc  
505M WCR.LPVEX10.20100921.111030\_113344.CPP-H1H2V2.nc  
255M WCR.LPVEX10.20100921.113345\_114528.CPP-H1H2V2.nc

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sep23 (rf05):  
total 2.1 GB

508M WCR.LPVEX10.20100923.085941\_092301.CPP-H1H2V2.nc  
145M WCR.LPVEX10.20100923.092302\_092941.CPP-H1H2V2.nc  
763M WCR.LPVEX10.20100923.093234\_100739.CPP-H1H2V2.nc  
680M WCR.LPVEX10.20100923.104912\_112026.CPP-H1H2V2.nc

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sep25 (rf06):  
total 3.5 GB

749M WCR.LPVEX10.20100925.070721\_074145.CPP-H1H2V2.nc WCR barely  
detected a thin very  
weak cloud layer near  
ground (400m top; not seen  
in the the quicklook  
image)

936M WCR.LPVEX10.20100925.074146\_082448.CPP-H1H2V2.nc  
602M WCR.LPVEX10.20100925.082450\_085231.CPP-H1H2V2.nc  
859M WCR.LPVEX10.20100925.085232\_093202.CPP-H1H2V2.nc  
391M WCR.LPVEX10.20100925.093204\_095001.CPP-H1H2V2.nc

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sep29 (rf07): mostly clear air ocean backscatter  
total 2.2 GB

618M WCR.LPVEX10.20100929.071135\_075030.CPP-V2H2.nc  
294M WCR.LPVEX10.20100929.075031\_080900.CPP-V2H2.nc  
367M WCR.LPVEX10.20100929.080901\_083205.CPP-V2H2.nc  
294M WCR.LPVEX10.20100929.083206\_085036.CPP-V2H2.nc  
356M WCR.LPVEX10.20100929.085037\_091259.CPP-V2H2.nc  
284M WCR.LPVEX10.20100929.091300\_093053.CPP-V2H2.nc

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oct04 (rf08): clear air ocean backscatter and cloud legs  
total 2.8 GB

50M WCR.LPVEX10.20101004.085438\_085745.CPP-V2H2.nc  
47M WCR.LPVEX10.20101004.085747\_090050.CPP-V2H2.nc  
214M WCR.LPVEX10.20101004.090052\_091421.CPP-V2H2.nc  
210M WCR.LPVEX10.20101004.091422\_092735.CPP-V2H2.nc  
287M WCR.LPVEX10.20101004.092814\_094054.CPP-H1H2V2.nc  
202M WCR.LPVEX10.20101004.094104\_095346.CPP-V2H2.nc  
243M WCR.LPVEX10.20101004.095347\_100903.CPP-V2H2.nc  
475M WCR.LPVEX10.20101004.100904\_103000.CPP-H1H2V2.nc  
624M WCR.LPVEX10.20101004.103001\_105732.CPP-H1H2V2.nc  
122M WCR.LPVEX10.20101004.105733\_110255.CPP-H1H2V2.nc  
336M WCR.LPVEX10.20101004.110257\_111822.CPP-H1H2V2.nc

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oct08 (rf09):  
total 1.5 GB

549M WCR.LPVEX10.20101008.095854\_102406.CPP-H1H2V2.nc  
257M WCR.LPVEX10.20101008.102407\_103555.CPP-H1H2V2.nc  
274M WCR.LPVEX10.20101008.103557\_104831.CPP-H1H2V2.nc  
27M WCR.LPVEX10.20101008.104832\_105058.CPP-H1H2V2.nc  
172M WCR.LPVEX10.20101008.105059\_110625.CPP-H1H2V2.nc  
259M WCR.LPVEX10.20101008.112235\_113428.CPP-H1H2V2.nc

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oct10 (rf10):  
total 5.6 GB

136M WCR.LPVEX10.20101010.073352\_074247.CPP-H1V2.nc  
274M WCR.LPVEX10.20101010.074248\_075522.CPP-H1H2V2.nc  
278M WCR.LPVEX10.20101010.075524\_080809.CPP-H1H2V2.nc  
137M WCR.LPVEX10.20101010.080810\_081426.CPP-H1H2V2.nc  
307M WCR.LPVEX10.20101010.081428\_082834.CPP-H1H2V2.nc  
405M WCR.LPVEX10.20101010.082835\_084710.CPP-H1H2V2.nc  
384M WCR.LPVEX10.20101010.084712\_090450.CPP-H1H2V2.nc  
602M WCR.LPVEX10.20101010.090451\_093230.CPP-H1H2V2.nc  
453M WCR.LPVEX10.20101010.093231\_095321.CPP-H1H2V2.nc  
564M WCR.LPVEX10.20101010.095322\_101918.CPP-H1H2V2.nc  
198M WCR.LPVEX10.20101010.101931\_102838.CPP-H1H2V2.nc  
266M WCR.LPVEX10.20101010.103123\_104337.CPP-H1H2V2.nc  
431M WCR.LPVEX10.20101010.104338\_110325.CPP-H1H2V2.nc  
425M WCR.LPVEX10.20101010.110327\_112258.CPP-H1H2V2.nc  
507M WCR.LPVEX10.20101010.112259\_114616.CPP-H1H2V2.nc  
302M WCR.LPVEX10.20101010.114617\_120011.CPP-H1H2V2.nc

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oct12 (rf11):  
total 5.1 GB

697M WCR.LPVEX10.20101012.070141\_073342.CPP-H1H2V2.nc  
177M WCR.LPVEX10.20101012.073343\_074152.CPP-H1H2V2.nc  
192M WCR.LPVEX10.20101012.074153\_075041.CPP-H1H2V2.nc  
227M WCR.LPVEX10.20101012.075042\_080107.CPP-H1H2V2.nc  
215M WCR.LPVEX10.20101012.080108\_081059.CPP-H1H2V2.nc  
217M WCR.LPVEX10.20101012.081100\_082057.CPP-H1H2V2.nc  
209M WCR.LPVEX10.20101012.082058\_083035.CPP-H1H2V2.nc  
440M WCR.LPVEX10.20101012.083036\_085049.CPP-H1H2V2.nc  
403M WCR.LPVEX10.20101012.085050\_090921.CPP-H1H2V2.nc  
428M WCR.LPVEX10.20101012.090922\_092903.CPP-H1H2V2.nc  
406M WCR.LPVEX10.20101012.092904\_094743.CPP-H1H2V2.nc  
133M WCR.LPVEX10.20101012.094744\_095351.CPP-H1H2V2.nc  
236M WCR.LPVEX10.20101012.095657\_100748.CPP-H1H2V2.nc  
296M WCR.LPVEX10.20101012.100749\_102124.CPP-H1H2V2.nc  
287M WCR.LPVEX10.20101012.102125\_103437.CPP-H1H2V2.nc  
591M WCR.LPVEX10.20101012.103438\_110147.CPP-H1H2V2.nc

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oct14 (rf12): Limited 10Hz data set available from the aircraft  
total 4.6 GB (only LAT,LON,ALT of the aircrft dependent variables  
have valid values; Doppler velocity is not corrected  
for aircraft motion contribution)

978M WCR.LPVEX10.20101014.072054\_080552.CPP-H1H2V2.nc  
336M WCR.LPVEX10.20101014.080553\_082120.CPP-H1H2V2.nc  
303M WCR.LPVEX10.20101014.082121\_083518.CPP-H1H2V2.nc  
322M WCR.LPVEX10.20101014.083519\_085006.CPP-H1H2V2.nc  
384M WCR.LPVEX10.20101014.085007\_090747.CPP-H1H2V2.nc  
531M WCR.LPVEX10.20101014.090748\_093212.CPP-H1H2V2.nc  
661M WCR.LPVEX10.20101014.093213\_100237.CPP-H1H2V2.nc  
357M WCR.LPVEX10.20101014.100238\_101901.CPP-H1H2V2.nc  
451M WCR.LPVEX10.20101014.101902\_103945.CPP-H1H2V2.nc  
25M WCR.LPVEX10.20101014.103946\_104056.CPP-H1H2V2.nc  
322M WCR.LPVEX10.20101014.104256\_105745.CPP-H1H2V2.nc  
38M WCR.LPVEX10.20101014.105746\_105931.CPP-H1H2V2.nc

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oct16 (rf13):  
total 2.9 GB

685M WCR.LPVEX10.20101016.091658\_094825.CPP-H1H2V2.nc  
634M WCR.LPVEX10.20101016.094827\_101735.CPP-H1H2V2.nc  
629M WCR.LPVEX10.20101016.101737\_104631.CPP-H1H2V2.nc  
595M WCR.LPVEX10.20101016.104716\_111331.CPP-H1H2V2.nc  
349M WCR.LPVEX10.20101016.111347\_112949.CPP-H1H2V2.nc

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oct17 (rf14):

radar problem; no radar data

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oct19 (rf15):  
total 5.3 GB

- 698M WCR.LPVEX10.20101019.070308\_073512.CPP-H1H2V2.nc
- 569M WCR.LPVEX10.20101019.073513\_080122.CPP-H1H2V2.nc
- 627M WCR.LPVEX10.20101019.080123\_083012.CPP-H1H2V2.nc
- 491M WCR.LPVEX10.20101019.083013\_085246.CPP-H1H2V2.nc
- 675M WCR.LPVEX10.20101019.085248\_092349.CPP-H1H2V2.nc
- 428M WCR.LPVEX10.20101019.092711\_094651.CPP-H1H2V2.nc
- 369M WCR.LPVEX10.20101019.094653\_100349.CPP-H1H2V2.nc
- 561M WCR.LPVEX10.20101019.100350\_102936.CPP-H1H2V2.nc
- 517M WCR.LPVEX10.20101019.102937\_105322.CPP-H1H2V2.nc
- 449M WCR.LPVEX10.20101019.105323\_111402.CPP-H1H2V2.nc

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oct20 (rf16):  
total 4.5 GB

- 585M WCR.LPVEX10.20101020.073217\_075911.CPP-H1H2V2.nc
- 644M WCR.LPVEX10.20101020.075912\_082849.CPP-H1H2V2.nc
- 377M WCR.LPVEX10.20101020.082850\_084608.CPP-H1H2V2.nc
- 480M WCR.LPVEX10.20101020.084610\_090812.CPP-H1H2V2.nc
- 467M WCR.LPVEX10.20101020.090813\_092941.CPP-H1H2V2.nc
- 306M WCR.LPVEX10.20101020.092942\_094346.CPP-H1H2V2.nc
- 780M WCR.LPVEX10.20101020.094633\_102223.CPP-H1H2V2.nc
- 618M WCR.LPVEX10.20101020.102225\_105048.CPP-H1H2V2.nc
- 262M WCR.LPVEX10.20101020.105049\_110252.CPP-H1H2V2.nc

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22K LPVEX10.20100804.cdl Processing  
cdl file  
10K wcr2conf\_lpvex10.pro WCR  
configuration file

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LPVEX10 WCR Processed Data Files Release Notes  
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\* All WCR data product files (processed data) are in NetCDF and are cataloged above. Additional information about the variables and attributes in the files is provided in the netcdf prototype file LPVEX10.20100804.cdl. Detailed information about the radar configuration and calibration is given in wcr2conf\_lpvex10.pro.

\* The data files are saved in directories (mmmDD) representing the month and date of the flight using the WCR. ATTENTION: If you are reading these notes via the WCR project web page the processed data directories/files are available for download via the web. The access may be password protected. Contact the PI(s) for user/password information.

\* Revision history:

= RevisionDate: 8 November 2010  
= RevisionNumber = 1  
= Revision\_1: Reflectivity, Doppler velocity  
= ProcessAuthor: Samuel Haimov (haimov@uwyo.edu, atsc-cc@uwyo.edu)

\* Known specifics of the data in this revision

General:

= This is the first field deployment of the new WCR (WCR2) on the UW King Air.

All hardware except the antennas is new. There has been a complete rewrite of all processing routines as well as change in the netCDF format and variable names and attributes. Attempt has been made to preserve as much similarities as appropriate to the old WCR (WCR1) formatting.

Reflectivity factor:

= Reflectivity absolute accuracy has not been established for WCR2 yet.

Given the past experience no more than 2.5 dB uncertainty is expected.

The precision for the full received power dynamic range of the radar

is expected to be less than 1 dB due to the use of digital receivers,

which do not exhibit significant non-linearities, drift, and receiver

frontend temperature dependence. The received power from the up-pointing

antenna has been calibrated with a corner reflector. The down and down-slant channels are calibrated relative to the up-channel using weather targets. The additional uncertainty for the down antenna and down-fore antennas w.r.t. the up antenna is about 0.5 and 1.5 dB, respectively.

= The receiver stability is better than 0.5 dB/hour.

= The transmitter leak to the first few range gates of the received signals is small (estimated to less than 0.3dB above the mean noise) or not noticeable. However an unidentified interference has been found in the first few range gates. It can spike as high as 10 dB above the mean noise.

It is present in most if not all of the data.

= The received signal from the up and down antennas can get saturated by weather targets stronger than about +22 dBZ in the first 200-300 m from the radar/aircraft. Surface return for up to 5.5 km AGL may have pixels(data points) in the saturation range (0 to ~2.7 dBm). The percentage of saturated profiles decreases with range and is small at large ranges.

= Cross-antenna talk is possible. Strong down-aft antenna targets may leak to the up antenna return and strong down antenna targets may leak into the down-aft antenna return. The most frequent cross-talk contamination is from surface returns and it is apparent in the quick look images.

= Reflectivity is not corrected for attenuation due to absorption and scattering. It could be significant in the presence of liquid water and precipitation.

Velocity:

= Corrected Doppler velocity from the down-pointing beams may have bias of up to +/- 1.0 m/s and uncertainty of up to +/-1.0 m/s. Typical bias and

uncertainty are less than  $\pm 0.5$  m/s. It is our belief that the bias is mainly due to changes in the antennas pointing angles caused by flexing of the aircraft fuselage not represented in the IRS data. In addition the fuselage expands with altitude and this also changes slightly the antenna pointing directions. Errors in the IRS(navigation) data have an effect as well.

= Corrected Doppler velocity accuracy from the up-pointing antenna is not quantified with a known reference target. The analysis of appropriate weather targets suggests a maximum bias of  $\sim 1$  m/s.

= The errors in the beam pointing angles for the up and down beams as well as some other errors lead to possible discontinuity in the mean vertical Doppler velocity profile at the flight level. The discrepancy is generally less than 0.3 m/s and typically within 0.1 m/s. It is not established which beam is contributing more to this error. Given that the aircraft flexes/expands differently at the up/down antenna location and the antenna locations as well as the dependence of these distortions on the altitude and attitude of the aircraft there is no single optimal correction (optimal set of beam angles) for all conditions.

= The Doppler data occasionally exhibit folded velocity regions (mostly in the slanted beam return). We do not make an attempt to unfold due to difficulties of automating this process. Typically unfolding any specific data segment is not difficult. For help on this you may contact Samuel Haimov (haimov@uwo.edu).

\* Known corrupted data not fixed in this revision:

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