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1. ABSTRACT

Recently introduced Columnar Vertical Profiles (CVPs) arrange a) Monitoring aircraft approach for hazardous weather polarimetric radar data, collected via plan position indicator (PPI) scans in height vs. time format. A novel method for polarimetric radar data processing and visualization based on CVP, path-CVP (pCVP), representing the data in height vs. distance format, is introduced. pCVP is a snapshot of the polarimetric radar data along the arbitrary or predefined path with very high spatial resolution. Multiple examples from Sband WSR-88D radars demonstrate the potential usage and advantages of the technique. Monitoring and quantifying instantaneous weather conditions with polarimetric radar along the motorways, mountain overpasses, and aircraft paths during the descent and ascend from the runway are just some of the benefits the novel technique offers. The increasing distance from the radar, and the size of the area used for CVP spatial averaging, may limit its practical usage.

2. pCVP INTRODUCTION – CONSTRUCTION FROM CVP



Figure 1: Radar Column Vertical Profile (CVP)



Figure 2: Construction of pCVP (temporal snapshot) from CVP columns (green bars) along the arbitrary path (red line)

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Path-CVP (pCVP) - Polarimetric radar data snapshot along the predefined path based on Columnar Vertical Profiles

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Figure 3: Map of the OKC area with Will Rogers airport runway in the middle of the ruler (12.42 mi; 20 km; black line).



Refreezing at ~0.4-0.5 km AGL; 1335 UTC, 2022-02-23



EF3 tornado. Red line show the tornado damage path

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Figure 8: KBUF pCVP of Z, Kdp, ZDR, and ρ_{hv} aligned with I-90 stretch from (1) Dunkirk, NY, to (2) 490 exit to Rochester; 1836 UTC, 2022-12-22

4. SUMMARY

A novel radar data processing technique, path-Columnar Vertical Profile (pCVP; height vs. distance format) can be used for monitoring and quantifying instantaneous weather conditions with polarimetric radar along the predefined path (highways, mountain overpasses, and aircraft paths in proximity of the airport). The radar beam geometry, and the size area used for CVP averaging, can be adjusted based on application.