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Atmospheric Measurement Techniques Discussions

Interactive comment on "Joint Analysis of Convective Structure from the APR-2 Precipitation Radar and the DAWN Doppler Wind Lidar During the 2017 Convective Processes Experiment (CPEX)" *by* F. Joseph Turk et al.

Anonymous Referee #1

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The paper presents some very interesting measurements collected during the CPEX experiment by joint Doppler Aerosol Wind Lidar and a dual frequency Doppler radar observations. The paper is very important because lays the foundation on how to integrate these two different Doppler observing systems. The paper is generally very well written. I am looking forward seeing the data used for a better understanding of the linking between 3-D air motion and cloud structure in a peer-reviewed journal.

I have mainly some comments to improve the layout and to add the information content of some of the figures. Also Sect4. could be improved.

Line 140: "any developed " ==> developed

Fig.4: it is very difficult to read this figure. In particular the overlapping of the image colour and the coloured dots is particularly troublesome. Why not shifting the dots upwards by 0.5 degree latitude (properly commenting on that in the caption) ?

Fig5: maybe it is worth saying that no image colour is present if no clouds with reflectivity above radar sensitivity are present in the layer

Fig7: colour-scale is in dBZ not dB, right? (also line 223 and through the document)

Fig8: red box: If the red box represents the blind zone it should follow the aircraft flight level and go oblique before scan 500. "above 6-km (where the SNR is highest), and below 3-km (where the aerosol content is higher)" it is a little bit misleading because I think in both cases the SNR is high, in the first case because of the shorter range, in the second for the higher backscattering. In general it is not clear to me why between 1000 and 1500 (there is not a clear range dependence in the upper part, is the lower part structure related to aerosol in the first two km?) the black dots are distributed like they are. Maybe over-plotting lidar SNR contour levels could help. Same applies to Fig.10-12-14. Also isn't in all such figures a lost opportunities? Why not showing for some of the black dots the wind direction? We could actually appreciate wind shear in proximity of convective clouds.

Fig.8: about the "continuous "impenetrable" cloud structures" comment obviously the lidar will see through the 3D structure, no question. I am a little bit sceptical about the profile at 192746 UTC; I cannot imagine that the lidar signals goes through the black dots as currently drawn; are we guessing here that there is basically no cloud liquid for that specific path and light will go through rain and ice? otherwise couldn't we argue that the path maybe a little bit different from the one currently drawn (you have pointing uncertainties to account for, haven't you?)?

Sect.4: I understand that the retrieval of wind must be done in the aircraft reference of

frame but for the interpretation it is much better to go back to the usual system (E-W and N-S winds). Since the DC-8 heading is known this is a simple conversion. By so doing you will get rid of all the discussion about the heading and we will actually see the “real winds” (which are the relevant ones for the study of “dynamical processes”). Also the u,v notation is confusing since it is typically used for E-W and N-S winds.

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