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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Spatial and vertical structure of precipitating clouds and the role of background dynamics during extreme precipitation event as observed by C-band Polarimetric Doppler Weather Radar at Thumba (8.50° N, 77.00° E)" *by* Kandula V. Subrahmanyam and K. Kishore Kumar

Anonymous Referee #2

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General Comments

The work presented in this paper mainly shows that lower wind caused increased rain due to convection, which is a quite typical situation. According to the title of the paper I would expect to see flow convergence (from Doppler data) due to convection and actual polarimetric signatures (i.e. indication of particle type) in convective and precipitating

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Discussion paper

clouds (i.e. their vertical structure), but this was not done. Also, peak reflectivities are too low for extreme rainfall probably due to bad calibration of the radar. Finally, the text has a lot of grammar errors. The authors should make a careful editing of the paper whenever they want to resubmit it.

Specific Comments

l. 27: Low convergence by convection leads to upper divergence and not the opposite as it looks the way that this statement is structured. It may be due to the bad grammar which changes the meaning of many sentences in the paper. See other comments below for some of the many grammar errors in the text.

Introduction: This section is too long with many details and discussion which are not really needed and it should be shortened.

l. 42: Obviously, "dry" goes to winter season but this is not clear from the structure of the statement.

l. 58: replace "happen" with "create".

l. 60: replace "vertical ascent" with "convection" and " adding the additional" with "increasing the".

l. 63: replace "attributed to" with "connected with".

l. 65: replace "attributed to" with "examined ".

l. 67-69: delete the sentence "Further, ...in the atmosphere". It just repeats the same thing mentioned many time before.

l. 69-70: replace "have contributed" with ",correspond to".

l. 93: delete "were".

l. 169-177: put specifications in the table for short and long range operation and dual/single prf instead of discussing them in the text.

l. 179: describe the method to convert from polar to Cartesian coordinates. This is not that simple because the radar cell is of fixed gate length and angular width, which leads to sparse data at long ranges.

l. 223: probably the authors mean Fig. 2b, but the red circle is not visible. Also, Rho is a bit low in high rain areas, where it should be steadily above 0.95. This imply some V/H channel synchronization problem (thus, Phidp is a bit noisy too).

l. 240: The authors, state that negative Zdr represent vertically oriented (prolate) particles. Can they be more specific? There are other reasons for negative Zdr measurements, like differential noise (at edges of rain cells) or differential attenuation effects.

l. 247-248: The authors mention that Phidp is very useful for calibrating the radar. Was the radar actually calibrated with such or some other method? Did they verified it against e.g. in situ rainfall data?

Fig. 5: This not a really useful figure. Figure 4 is sufficient to show the vertical extend of the storm clouds.

l. 312: The rainfall described as "intense" corresponds to low to moderate reflectivity (rainfall rate correspondence?). Thus, it is not an intense rainfall and the time duration of core events is not many hours to result to a flood because of accumulated rainfall.

Fig. 6b: change "2019" in the title with "2018".

l. 333-334: The same comment as before for negative Zdr measurements.

Fig. 7: There is a lot of blockage (missing azimuth sectors) and ground clutter (non-regular texture of estimated rainfall field), which is strange with 11 elevations in each volume to select the one with less beam blockage and ground clutter. The 300 mm accumulated rain peaks in 4 days does not look to be a too extreme event (this depends on terrain too, but no information is provided).

Fig. 10: No wind direction is shown in Fig. 10. The authors should add wind arrows or

mention which wind component they show.

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