

Title: 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 (8.500N, 77.000E)

Author: Kandula V Subrahmanyam

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General comments

The author presents the capabilities of a C-band Doppler radar with dual polarimetric capabilities for analyzing the precipitating structures in a heavy rain event.

It is not necessary including the radar coordinates in the title neither in the abstract. Besides, I suggest indicating the country where the radar is place (not all the readers are familiarized with the Indian places and it allows understanding better what you will find in the manuscript)

English needs a huge reviewing. I suggest only some changes to the abstract, but there are a lot of errors in all the sections. Please, you should review the grammar.

Abstract

- "the cynosure" (besides, cynosure is not usual in atmospheric papers. I suggest "a focus of interest")
- Please, remove "as well as for common men"
- "This catastrophic event occurred **from** 12th to 17th August 2018 in which"
- "and the time evolution of **the** radar reflectivity structure is examined"
- "upper-level" and "lower-level" (hyphen)
- "It is well-known that these extreme events have been increasing over the Indian region during the past few years."
- I suggest rewrite as "The state of Kerala (India) experienced extreme rainfall events during August 2018. These heavy rains led to major flooding, regarded as one of the worst natural disasters experienced by the area in the last hundred years.". This is an example, but you should reduce your sentences. They are extremely long and difficult to follow.

About the structure:

- please, consider removing the lines 10-14. This is introductory and is not referring to your own work. The abstract is a trailer of your work, and you have to create interest in the readers using few sentences. All those not related to your analysis does not result interesting at this point.
- I suggest starting with the L18, and later you can present the event.
- In my opinion, what is the most interesting point of your research is that is the first time that Dual-Pol has been used in an event like this in your country. At least, I was not able of finding anything similar in the bibliography. Then, this is the key of your work and, besides the obtained results, shows that future research can improve notably the knowledge of the analyzed event type in India.
- Finally, "abbreviations should not be included without explanations" (https://www.natural-hazards-and-earth-system-sciences.net/for_authors/manuscript_preparation.html) and your

abstract has 345 words (an abstract of 100–200 words. https://www.natural-hazards-and-earth-system-sciences.net/about/manuscript_types.html)

Keywords

The keywords are those words that summarize your work. Do you think that the chosen ones are the correct? For instance, Monsoon or Dual-Pol provide more information.

Introduction

L69: How deep are the convective systems? Are you referring to mesoscale convective systems (MCS) or to mesoscale convective complexes (MCC) or to other type of convective mode? Can you explain this point?

L71: what IPCC means?

L96: what ISM means?

L141-144: I suggest rewriting these lines. You should introduce here the objectives (main and secondaries) of your research. However, you are explaining the analysis in general.

Description of C-band polarimetric DWR and base products

L155-156: is the radar operative for weather surveillance or is used only for research purposes?

L160-161: it looks to me that the degrees of the elevation seem "0" (zero) super index. Please, change by the correct symbol ($^{\circ}$). Besides, if you include them in table 1, you do not need to write here.

L158-180: Which is the range of the radar? Is the same for all elevations?

Table 1: the caption is not well placed

L175: san? Or scan?

Figure 1: I suggest you to remove the mid and right panels (which not provide any information), and makes the left one larger. Besides, you can improve it, including a general map of India and changing the current one by another considering the topography of the region. The new proposal would orientate the reader about the radar environment.

Figure 2: Which software have you used for displaying the radar data? Interesting to include in the text. Besides, it results interesting to explain the reason of the discontinuity in the N ray and, also, in the 120° direction (E-SE). You need to add some labels for helping the identification in the text. (L208-256)

L221: I suppose that you are referring to fig. 2

For the para that goes from L208 to 256, I suggest a re-distribution of the text. In my opinion, it is necessary that first you introduce the variable (e.g. reflectivity, radial wind, spectral width...), explaining what you analyze in the imagery, and after, a description of the image of figure 2. Besides, including the labels would help to detect the key signatures and understanding better the imagery from the point of view of the reader. In this point, you can combine with the meteorological

explanation. I suggest <https://journals.ametsoc.org/doi/full/10.1175/BAMS-D-17-0317.1> for describing dual-pol variables, but there are many other in the bibliography.

Results and Discussions

I suggest you to change the title of the section by "Analysis of the event"

Figure 3: the text about this figure must explain why you have selected the concrete period. Besides, I suggest indicating in the map what you are referring in the text (e.g. "deep convection, where it was located over the Arabian Sea"). Why you do not indicate the line at 7.51 UT? Another thing about this time, which is important in the text: "most of places in and around Kerala", please, mark with a star or a similar symbol.

Figure 4: it would be nice to know the transect used for making the cross section (you can display it in figure 3). Besides, I think that these graphs should be accompanied of other products (radial wind or polarimetric products).

I don't understand the meaning of the figure 3 if you include after figure 4. What are you trying to explain in both figures that differentiate them? Please, you must explain clearly the intention of each figure.

Figure 5: I don't understand why are you always considering the same direction of the cross section if the system you follow is moving in time. Question about this figure and the radar functioning: did you notice about attenuation signal caused by heavy rainfall over the radome?

Figure 6: title of "y-axis" should be "direction". The description of this figure is vague and it is basic in the present manuscript. In special, the part of the polarimetry should be improved.

I do not understand the link between figure 6 and 7. In the previous cases, figures 3, 4, 5 and 6, the interaction between them was weak and need to increase some sentences explaining why you move from one subject to the other. In the case of the transition between figures 6 and 7, this transition is null. You change from polarimetric analysis of precipitation evolution to daily cumulated rainfall without explaining this move. Please, include some connectors between all the figures, being more concise in the last case.

Figure 7: the figure needs a clear improvement. There is no spatial reference (location of the area of analysis). Besides, you should explain many artifacts that appear in the imagery: effect of topography, beam blockage, propagation of the structures...

Figure 8: Please, include in some of the previous figures (preferent fig. 1) the location of the radiosonde station. This is important to know the reliability of the thermodynamic analysis on respect the area of analysis. Besides, why do you include all the month period? Why do you not focus on the period of interest, and include the daily cumulated (or better the 12-hour cumulated) rainfall values in the area of analysis?

What is Western Ghats? For foreign people, you need to explain (and include in a map) all the geographic elements included in the study. (another example is the Arabian Sea)

Sections 3.1 and 3.2 must be better connected: you need to include some sentences explaining how meteorological aspects are related to the radar imagery.

Summary and discussions

The sentence "The maximum reflectivity 456 and width of convective core found to be 45 dBZ and 7 km respectively." makes reference to something not explained before. You cannot write here about something not shown previously.

Besides, you need to explain each conclusion in a different point.

Acknowledgements: Why are you using "the authors" if only one single person signs the manuscript?

References:

"These references have to be listed alphabetically at the end of the manuscript under the first author's name." (https://www.natural-hazards-and-earth-system-sciences.net/for_authors/manuscript_preparation.html)

I only attach some examples, but it may exist in more cases.

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