



Comment on acp-2021-346

Anonymous Referee #2

Referee comment on "Overview: Fusion of Radar Polarimetry and Numerical Atmospheric Modelling Towards an Improved Understanding of Cloud and Precipitation Processes" by Silke Trömel et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-346-RC2>, 2021

This paper provides an overview of the German DFG Priority Program "Polarimetric Radar Observations meet Atmospheric Modeling (PROM)". This was a program that has undergone its first 3 years of research and this article serves as an overview article that apparently will follow this article in the journal. The paper provides a short background to the program and then goes through each project one by one and gives an overview and short overview of each project within the priority program. The paper reads very much like a summary report intended for funding program managers rather than a scientific article disseminating scientific results, in which very little background, prior research, and interpretation is given to each result shown. There also aren't any links to findings of the present project, which will apparently follow in the special issue (surely these papers must be submitted or close to submitted if the reviewer understands correctly?), but there aren't any pointers to those papers or other articles that came out of the first 3 years of funding. In addition, future directions of the project are not given. Since I do not have the full information about what the role of this article is, I will let the editors decide what to do with this paper. However, I do believe that the scientific community would benefit from a review article that pointed better to the published literature, current, and future work of the project. Thus I recommend returning the paper with major revisions.

Major comments

1. The paper has an inconsistent and overall light level of citing relevant prior literature when new concepts are introduced. A review/overview article should do a careful job in doing this. In looking at the citations, most are before 2015 and there are only a few since then. It seems like these citations are mostly from prior proposals/working documents? I suggest updating the article to have a more comprehensive/up to date bibliography. Also in the text, highlight and differentiate what has been found that is **new** rather than just a repeat/extension of what has been done already in the literature.
2. Are the figures in this paper from publications or are any publications that have arisen from or will be part of this collection or are anticipated to be submitted? Overall, I felt that the text read in the future tense quite often (written like a proposal, identifying goals)

rather than summarizing exactly what has been accomplished in the first 3 years of the project. With the renewal of the funding for the program presumably coming up - I would think that it would be in the interest of the program participants to put their best foot forward and highlight their results rather than reiterate their proposal from several years ago. Even if this will be done in subsequent publications - I believe that this article should point to those results.

3. The grammar in the article is quite variable from section to section. I suggest individual editors pass through the document to harmonize the voices, tenses, word usage, and punctuation throughout the document.

4. Many of the papers figures show illustrative points rather than any scientific hypothesis test or addressing any particular science question quantitatively. I will just point this out to the authors and the editor. It may be appropriate for this "prospectus" of the program, but as being tasked as a reviewer of this paper without any special instructions I just want to point this out.

Specific comments

1. L24: "the main" may be overstating the importance - it is really one of many according to the IPCC, etc.

2. L28: the usage of "e.g." is not standard in the document. Suggest finding/replacing with, "for example" or "such as".

3: L29: national weather service is a proper noun?

4. L32: suggest changing "higher moment" to "complex" as more species are also being introduced in addition to more moments.

5. L32: suggest moving 'still' to after 'gaps'.

6. L40: this sentence is redundant with what has already been said.

7. L42: "Since" -> "For"

8. L46: "parallel to" -> "parallel with"

9. L47: what is "their"?

10. L53: suggest inserting "consisting of" after "triangle".

11. L53: "and" -> "which"

12: L53: change subscript quotation to superscript for English"?

13. L59: just speak of the "triangle" rather than listing all 3 again?

14. L88: "hardly" -> "poorly"

15. L88: what are "these"? Processes?

16. L90: suggest removing "will".

17. L91: suggest adding "and including" before "the scale".

18. L94: who is "they"?
19. L94: induce*d*
20. L98-99: needs a citation
21. L116: needs citations.
22. L127-130: This sentence could use some more context.
23. L135: improve*s*
24. L137: needs citations
25. L144: please reword "even more to zoom"
26. L172: references to spectral polarimetry literature could help in this paragraph
27. L184: "ambiguities in ice crystal size and ice water content" - this is not a complete idea - ambiguities in retrieving these geophysical variables?
28. L193: remove "a"
29. L199, add comma after "date"
30. L201: e.g. -> such as
31. L218: again, missing references to prior work
32. L240: "allow to retrieve" -> permit the retrieval of
33. L253: noticing tense is future. see major comment above. This reads like a proposal rather than results and findings.
34. L334: use of e.g.