

**Editor's comment:**

Reviewer#1 states "...the manuscript contains plenty of mathematical derivations that are quite difficult to follow and check..." and Reviewer#2 states "The main problem of this manuscript, it is not easy to read." I have studied your replies to the reviewers and am convinced that your manuscript contains the complete set of mathematical derivations for an experienced radar user to understand and apply your methodology. However, I think you need to address a broader audience. Radar operators nowadays are not only experts in the field of radar polarimetry, so please make this manuscript also comprehensible for scientists using cloud radar from a variety of applications and even disciplines. Especially Sections 3 and 4 are dominated by equations and references to the appendices. Please make the scientific narrative clearer, it is there in principle, but not well recognizable. This could be improved by explaining why you are deriving which equation in more detail and discussing the outcomes of your derivation in relation to the original objective. This could also include formulating the title of the sub-sections in a more generally understandable way and relating a discussion of derivations unambiguously to these titles. Also, please consider more text details between the steps of your equation derivations. I'm sure that this will make your manuscript more accessible to a broader range of interested scientists.

**Response:**

First, we would like to thank the Editor for the comment. We agree that the manuscript in its current state could be difficult to follow for a reader not familiar with the topic. We therefore reworked the manuscript considerably. The introduced changes are listed below:

1. We added two sentences into the introduction briefly explaining what has been done within the study.
2. According to the Editor's recommendation, we split the section 2 into a number of small subsections focused on certain topics reflected in their titles.
3. We extended the introduction of the section 3. We explain in more details the steps taken in this section. We also added a reference where the same procedure is used.
4. We modified titles of subsections in the section 3 and added sentences guiding the reader through results and following steps.
5. We added the subsection 3.4 to better split the results derived for different basses.
6. In the section 3.4. we now explicitly state the final result of the section.
7. In the section 4 we extended the introduction to better guide a reader from the section 3 to 4.
8. In subsections 4.1 and 4.2 we added more sentences clearly stating the starting point and final results

9. In the subsection 5.5. we added a sentence to emphasize that the first element of the vectors  $b$  and  $c$  are the same.
10. In the section 6 we made it clear that no additional processing is required to get the vector  $b$  since it is an intermediate step from IQ data to conventionally used representation including  $B_{hh}, ZDR, \rho, \Phi$ .

We believe that the introduced modifications indeed improve the readability of the manuscript. If, however, the manuscript is still considered as too complicated, we highly appreciate if a list of specific points which are difficult to follow is provided.