

Atmos. Meas. Tech. Discuss., referee comment RC2
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Comment on amt-2021-426

Anonymous Referee #2

Referee comment on "A new scanning scheme and flexible retrieval for mean winds and gusts from Doppler lidar measurements" by Julian Steinheuer et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-426-RC2>, 2022

Development of a new method to retrieve gusts from Doppler wind lidar measurements is a useful contribution to the field. The approach is interesting and fairly well outlined by the authors, with a few minor issues resulting in a recommendation for minor revision.

Generally, my only comments are on the presentation of the method in text. There are some inconsistencies in the writing and clarity throughout the paper. For example, the grammar and style in the initial sections is sometimes bumpy, but very polished in the sections outlining the retrieval method itself. On the other hand the content in the initial sections is well thought out in guiding the reader while the sections about the retrieval method assume a lot about reader's background knowledge in the methods. Perhaps this isn't a bad assumption, but it is different in tone and style than other sections. Overall I think these sections could be more integrated regarding style and voice to improve flow and readability.

In terms of the content itself, I am very excited about this method. I did find myself wanting to see more observations processed through the retrieval; but I do understand space limitations and focus may preclude this. If it is possible to show more observations without distracting from the narrative, I think this would be good to further illustrate the utility of the method and point out the ability of the retrieval to estimate gusts and mean wind. In the various parts of the paper that mention assumptions required for Doppler lidar observation, I felt it got a little lost actually how some of those assumptions are still honored for this gust retrieval method while still allowing the gust data to be retained.

Specific comments:

47 - phrasing unclear: "only in certain of these air parcels."

48 - not sure what it means when you said large spatial extent influence different measurements and thus be more detectable. Consider rephrasing this to be more clear.

52 - Do you mean "The DWL they considered operated for two days..."? Using 'investigated' and 'scheduled' here is a little confusing.

53 - Wind gusts, then gust peaks are derived? Should "wind gusts" be "Winds" from which the "gust peaks" are obtained? This is a bit unclear here.

54-55 - Phrases from "The approach includes..." to "... meteorological tower": This is pretty unclear to the reader as written here.

73 - Was this meant to be practical?

87 - Which DWL?

168-172 - You write it can be seen that tripling the transmission rate does not increase the total cycle time. This isn't immediately clear.

397 - missing a space between 'both' and 'a' and the comma there is unneeded

401 - what is 'mostly correctly' in terms of reproduction of a time series? Not very precise.

402 - "Underestimates the gust minimum:" this language is difficult. Already, a 'gust minimum' is confusing, since gusts are synonymous with maxima. Is this really the best term? Now adding the proximal language of under or over estimation to this is very confusing. I quickly polled some colleagues about over- or under- estimating a minimum and where they thought those estimates would fall relative to the minimum. There was not agreement. I strongly recommend revisiting this language to avoid confusion. This is especially true in this case since the accompanying figure is a bit crowded, so contextual information wouldn't necessarily help readers deduce the answer.

412 - Has MLE been defined?

414 - Is the classic method retrieving gusts or not? The text and the figure caption both are a bit conflicting.

420 - Last sentence of this paragraph is very confusing. Not sure what it says.

444 - What is circulation based referencing?

476 - What is gusts where to warn in Germany?

Fig 4 - The double colorbar is odd. Also green-to-red is not very accessible to color-deficient readers. Explore more accessible color tables. This is also true for some of your other figures' line color combinations.

Figure 9 - There are a lot of lines and markers here making it hard to really see what's going on. The main points are sufficiently shown I suppose... but is this the best visualization? In many instances, I couldn't tell if there even were other markers behind black markers.

Fig 10 - Colorbar could be improved. Research has shown rainbow bars to be deficient.