

Atmos. Meas. Tech. Discuss., author comment AC1
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Reply on RC1

Katherine E. Lukens et al.

Author comment on "Exploiting Aeolus Level-2B Winds to Better Characterize Atmospheric Motion Vector Bias and Uncertainty" by Katherine E. Lukens et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-277-AC1>, 2021

Thank you very much for your careful and helpful comments. After the discussion period we will revise our manuscript following your suggestions. If we can collectively do so, we hope to take advantage of the discussion period to iterate with you on a small number of items (please see below).

Response to comments of Anonymous Referee #1 on preprint "Exploiting Aeolus Level-2B Winds to Better Characterize Atmospheric Motion Vector Bias and Uncertainty"

[Below, quotes from your comments are repeated verbatim in italics.]

1a. Please include a description, including a formula, of the Statistics used in your paper (MCD, SD, SDCD,...; possibly also the Speed Bias, Speed SD, RMS, Vector Diff, Vector RMS included in Table 1), and their relationship with the Statistics used as Standard procedure for AMV validation defined by the International Winds Working Group in its 1996 Workshop (http://cimss.ssec.wisc.edu/iwwg/iww3/index_3rdWindsWorkshop.htm) in following report: http://cimss.ssec.wisc.edu/iwwg/iww3/p17-19_WGReport3.pdf.

This is a good point. Because we are comparing the AMV and Aeolus HLOS_V, a scalar quantity, our statistics can only be analogs of the standard one. We plan to state that and include the formulae for all the statistics used in an appendix. Will this be satisfactory?

This is important; if I look throughout the internet "Mean collocation differences (MCD)", I find very few references, and all of them are from the year 2021.

We have coined this term to define a specific definition of "bias", which we feel is used in many different ways in various contexts. Would you suggest we replace MCD everywhere with "mean collocation difference"?

7. Important: In chapter 4.1.2 line 419 you say you compare only IR cloud AMVs and WV cloud AMVs with Aeolus Mie Cloud winds. Why don't you do the same in chapter 4.1.1, comparing Aeolus Rayleigh Clear Air winds with WV clear air AMVs only? Please include in the text an explanation of why you are acting differently in both chapters. Evaluate also if

there could be two different elements here, which behave differently:

- flow related to cloud features, evaluated by both Aeolus Mie winds and cloudy AMVs,*
- and flow related to clear air features, evaluated by both Aeolus Rayleigh winds and clear air AMVs.*

We will add the following explanation to the text.

“To increase the size of our collocation data set, we compared all types of AMVs to both Rayleigh-clear and Mie-cloudy winds. We excluded Rayleigh-cloudy and Mie-clear winds as they are not yet recommended for use by ESA. In addition, we do not show results from WVclear AMV collocations with Mie-cloudy winds as correlations for this category of collocations are poor and the sample size is small, and this result may be unreliable. With a larger data set it might be possible to compare Rayleigh-clear and Mie-cloudy winds to clear and cloudy AMVs only, respectively.”