

Review report for manuscript amt-2019-431

The current study deals with the intercomparison of AEOLUS' wind observations versus the ALADIN airborne demonstrator, whereas meteorological numerical outputs from the ECMWF are also employed for the further assessment of the spaceborne and airborne wind profiles. The analysis has been performed in the framework of the WindVal III campaign in which flights of the DLR Falcon are collocated with AEOLUS L2B observations. The manuscript is well organized and written, presenting adequately the obtained results while the authors' recommendations for relevant future Cal/Val studies enhance the quality of their work. The topic of the submitted paper fits very well to the scientific purposes of the AMT and can be published after addressing some minor comments and suggestions which are listed below.

1. I think that it will be useful to provide a figure with the AEOLUS' observational geometry in order to help the readers to understand better the LOS, HLOS, projections etc.
2. My opinion is that much of the technical details (Sections 2.1 and 3.1) can be removed from the text.
3. How much independent can be the comparison between AEOLUS and ECMWF winds since the spaceborne data are used in the data assimilation of the model?
4. Line 168: Clarify that groups refer to the observation level (i.e., Lines 146-147).
5. Line 170: Could you be more specific about the estimates of the scattering ratio?
6. Apart from demonstrator, ALADIN and model winds, have you checked if there are available data from soundings (e.g. Wyoming)?
7. Line 180: Can you provide a short statement about the "*known error sources*"?
8. Line 183: I would just say u and v components of the wind vector.
9. Line 187: Replace "..., *Germany in the time frame...*" with "..., *Germany in the time frame...*".
10. Lines 239-241: Mie signals attributed to aerosols' presence can also "contaminate" the Rayleigh response.
11. In all curtain plots the longitudes are missing in x axes.
12. Line 321: Do you mean below the clouds?
13. Equation 1: If I am not missing something, the formula should be $LOS=HLOS/\sin(\Theta)$. Please see my first comment.
14. Lines 431-432: Rephrase this sentence because it is somehow misleading. I suppose that the aerial weighting it is applied both in vertical and horizontal terms.
15. Lines 500-503: It would be useful to provide also the curtain plot for the A2D winds without the off-nadir angle correction.
16. Lines 514-515: It is quite strange to consider model outputs as reference values!
17. Figures 10 and 11: How much different are the results when are considered only coincident measurements from the three datasets?