

## Review report

The topic of the submitted study is the evaluation of the Aeolus Rayleigh-clear winds against radiosondes and ground-based lidars acquired at two observatories (OHP, OPAR) in the framework of the AboVE validation campaigns. Moreover, an assessment throughout the satellite mission is performed using twice-daily routine Météo-France radiosondes and regular lidar observations. Overall, it is a very interesting work covering all the necessary aspects of a comprehensive Cal/Val study. I would like to acknowledge also that the authors are comparing their results against those obtained from numerous previous studies. However, I think that the weak point of the study is the absence of evaluation results for the Mie-cloudy winds. I believe that the authors should either support better their decision or include a similar analysis for the Mie-cloudy winds. Please find below my (minor) comments which should be addressed prior publishing the manuscript.

1. **Lines 32-33:** Please rephrase this sentence.
2. **Line 50:** Aeolus provides vertical profiles of HLOS and not of LOS.
3. **Line 56:** Replace “Aeolus’s” with “Aeolus”.
4. **Lines 144-150:** Please explain why you are focusing only on Rayleigh-clear winds. The description of the cross-talk issue can be improved.
5. **Line 149:** It is the first time that the HLOS is mentioned in the text and should be written explicitly. Check all similar instances throughout the text.
6. **Lines 153-154:** Rephrase this sentence.
7. **Lines 164-170:** It will be helpful to mention here Figure 5a in [Lux et al. \(2020\)](#).
8. **Lines 188-194:** Can you add a figure visualizing the applied methodology? It is not clear to me why you are averaging the radiosondes measurements and the lidar retrievals between the Aeolus bins’ middle points and not within their range (i.e., from base to top of each Aeolus bin).
9. **Lines 199-201:** Why the azimuth angles are the same between dawn and dusk Aeolus orbits?
10. **Lines 238-245:** Please consider rewriting and improving this paragraph. Can you explain better the statements “...measurements better than 10km...” and “...still remained within 100km.”? To my opinion, they are not obvious in the relevant figure.
11. **Lines 255 – 256:** This sentence needs a correction.
12. **Line 311:** How have you defined the 200 km window?
13. **Lines 317-319:** Please rephrase this sentence.
14. **Figure 3:** Do you see a different behavior when reproducing the same plots separately for each station?
15. **Line 347:** I think that you are referring to Figure 4.
16. **Line 412:** Which method?
17. **Lines 511-513:** I think that it is not feasible to generalize such results since maybe there are not valid for other stations characterized by different weather/wind regimes. There is also a similar statement in the Discussion section.
18. **Figure 6:** It would be very useful to use different shading colors (as background) corresponding to each baseline and show with double-edge arrows the two laser-periods (FM-A, FM-B).
19. **Lines 616-618 and lines 619-623:** There is a contradiction between these two parts. Can you clarify better your statements?