We thank the reviewers for the relevant comments that helped to improve the manuscript.

Answers to reviewer #1

General comments

My main comment concerns the analysis method. Two criteria, the CC and RMSE, are introduced to quantify similarities/discrepancies between the various instruments results. Values are obtained, and it is concluded that the agreement is good, but the reader may wonder: - what is the significance (statistically) of the computed CC and RMSE values: it is said that at least 20 points are used, but a limit of 20 appears quite low to get an unbiased estimation of CC/RMSE. - what are the threshold values that CC and RMSE values are desired to overcome in order to conclude that the agreement is "good". To my mind, the analysis would gain in clarity if these questions were addressed with more details.

The same number of measurements at the same spatial resolution is used in the statistical analyses. The two sets of variables are wind velocities and one expects a linear relationship. So, we use the Pearson Correlation coefficient (C, see Eq.2). In practice, $C >$ 0.7 suggests a strong correlation, while $0.3< C <0.7$, would stand for moderate correlation. The coefficient of determination that is the square of Correlation coefficient (C^2) quantifies the proportion of the variance of one wind velocity set explained by the other. By definition, the RMSE (DV, see Eq.3) does include both variances and bias. A comparison of C^2 and RMSE indicates the importance of bias in the statistical analyses of the two data sets.

The Correlation coefficient is not reliable when computed on a small number of measurements for each data set. Spurious correlations in by two-tailed probability occur when a small number of measurements is use (5 as an example). The spurious correlation are negligible when 20 measurements are used (their probability is less than 1%).

Supposing the errors have a normal distribution, a statistically significant accuracy on RMSE requires 20 points to achieve a 95 percent confidence level. Then it is acceptable that one point may exceed the computed accuracy. Ref: National Standard for Spatial Data Accuracy (NSSDA) (FGDC, 1998)

In the course of the analyses, only lidar profiles with 20 pints or more have been selected for the analysis. This discussion is included in the revised manuscript.

Specific comments

Abstract. The abstract could more specifically introduce what is reported in the paper, perhaps by including parts of the 2nd paragraph of section 1 page 4554.

Abstract has been changed following the suggestions

Section 1. Direct detection wind lidars do not all employ Double-Fabry-Perot etalons as suggested here. Systems employing Mach-Zehnder or Michelson interferometers, or iodine notch filters are also employed. "Atmospheric particle loading has been questioned": To the author's knowledge, did any study finally evidence the non-suitability of the particle loading for ADM-Aeolus ?

Agreed the info is missing. Two beams interferometer such as a Mach-Zehnder interferometer has been proposed by Bruneau et al, 2002 (Bruneau D., "Fringe-imaging Mach-Zehnder interferometer as a spectral analyzer for molecular Doppler wind lidar ", Appl.Opt. 41, 2002, p.503) and a combination of two Michelson interferometers has been studied by Cézard et al., 2009 (Cézard, N., Dolfi-Bouteyre, A., Huignard, J.P., Flamant, P." Performance evaluation of a dual fringe-imaging Michelson interferometer for air parameter measurements with a 355nm Rayleigh–Mie lidar", Applied Optics, Vol. 48 N.12, 2009, pp. 2321-2332)

.

In the past, iodine notch filter has been proposed as HSR filter by Ziu et. al 1997 (Z. S. Liu, W. B. Chen, T. L. Zhang, J. W. Hair, and C. Y. She, "An incoherent Doppler lidar for ground-based atmospheric wind profiling," Appl. Phys. B 64, 561–566 1997) and Friedman et al., 1997 (Friedman, J. S., C. A. Tepley, P. A. Castleberg, and H. Roe, Middle-atmospheric Doppler lidar using an iodine-vapor edge filter, Optics Letters, 22, 1648-1650, 1997)

Atmospheric aerosols loading received a great deal of interest by NASA in the late 80's and 90's in support of NASA's LAWS project for a space-borne wind sensing lidar. The backbone was the NASA's Global Backscatter Experiment (GLOBE) project with two Airborne circum-Pacific aerosol backscatter surveys in 1989 and 1990. At the time, the NASA's DC8 aircraft carried several multiple wavelengths pulsed lidars and various in situ probes (see R. T. Menzies and D. M. Tratt: Airborne lidar observations of tropospheric aerosols during the GLOBE Pacific circumnavigation missions of 1989 and 1990. *J. Geophys. Res.*, 102(D3), 1997, 3701-3714, R. T. Menzies, D. M. Tratt, and P. H. Flamant: Airborne CO_2 coherent lidar measurements of cloud backscatter and opacity over the ocean surface. *J. Atmos. Oceanic Technol.*, **11**(3), 1994, 770-778, R. T. Menzies and D. M. Tratt: Airborne CO_2 coherent lidar for measurements of atmospheric aerosol and cloud backscatter. *Appl. Opt.*, **33**(24), 1994, 5698-5711**)**. The analyses and modeling efforts conducted during the GLOBE project concluded to a limited capability of an affordable heterodyne lidar in space to profile tropospheric wind with the expected accuracy (1 m/s in the lower troposphere and 2-3 m/s in the mid and upper troposphere).

Section 4. The significance of the computed CC and RMSE coefficients would be worthwhile to discuss.

See answer to the first comment

Conclusion

It is said that the agreement is "good" between 0.355 mm lidar and radiosoundings, with a 0.78 average CC value and 3.67 m/s average bias. It would be nice if the author could explain, with respect to the pursued scientific objective why these CC and bias values can be considered as "good". Tables in Table 2, the precision of the 10.6 µm heterodyne lidar is written to be 0.4 m/s. The corresponding altitude should be mentionned, since it is unlikely that such performance is obtained all along the 1.5-12 km range.

See answer to the first comment. In the revised manuscript, all the analysis will be performed for lower troposphere (0-5km) and upper troposphere (5-15km)