

Dear Editors and Reviewer:

Thank you very much for your careful review and valuable suggestions with regard to our manuscript “Comparisons and quality control of wind observations in a mountainous city using wind profile radar and the Aeolus satellite” (Manuscript Number: amt-2023-152). The comments are helpful for revising and improving our paper. We have carefully studied these comments and made changes in the manuscript according to reviewers’ comments.

General comments

This study conducted data verification and quality control on wind profile radar and Aeolus wind products, trying to enrich the available wind observations in regions with complex regions. This kind of study is needed to provide more reliable wind observations for both related mechanistic studies and assimilation applications in numerical weather prediction. Generally, this work is quite meaningful and informative. Most results are pretty valuable to atmospheric measurement studies. I would recommend its acceptance for publication after some necessary revisions.

Response: We would like to thank the reviewer for the valuable and affirmative comments of our manuscript.

Specific comments

1. Line 85: “determining the movement of atmospheric components”, what determining the movement of atmospheric components? Please reorganize this sentence.

Response: Thanks for the careful suggestion. To make it clearer, we have reorganized this sentence as: “Owing to the unique terrain, the mechanism of extreme weather and movement of atmospheric components are intricate and complex”.

2. In “2.1 Data”, the location of wind profile radar, radiosonde station, and Aeolus tracks used in this study should be showed in a figure.

Response: Thanks for this suggestion. We have added Figure 1 to show the location of ground-based observation stations and Aeolus tracks, and rearranged the order of Figure 2-8.

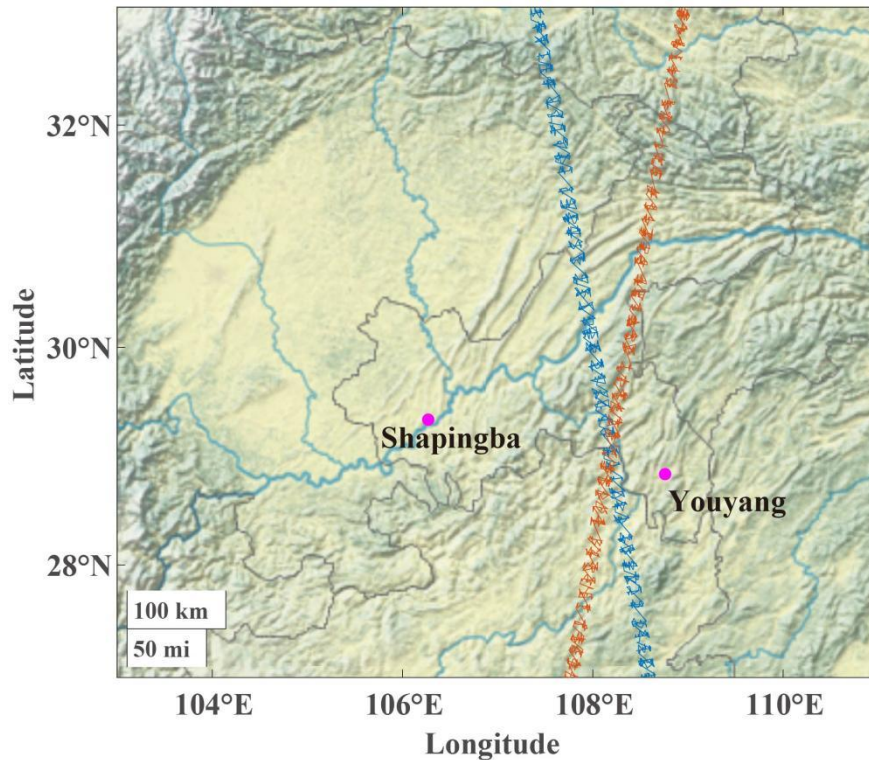


Figure 1. Geographic locations of ground-based wind observation stations and Aeolus tracks along within Chongqing. The magenta dots denote ground-based observation stations, while red and blue line represent Aeolus tracks. The background is the terrain heights.

3. Line 112: “Radar can operate almost automatically” should be “Radars can operate almost automatically”, as there are two radars.

Response: We are sorry for this clerical error and have made modification in the revised manuscript.

4. In “2.2 Methods”, The number labels of equations are missing in this manuscript. Please add the labels, so that the readers could find corresponding equations.

Response: We are sorry for the neglect and have added labels for Equation 1-7 in “2.2 Methods” of the revised manuscript.

5. In Table 1: how do the authors get these extreme climate wind values?

Response: Thanks for this comment. We get these extreme climate wind values referring to Zuo(2020). The detail of the reference is as below:

Zuo Q. M.S. 2020. Research on Quality Control Methods and Assimilation Application of Wind Profiler Radar Data. Nanjing: Nanjing University of Information Science and Technology.

We have added the citing when first mentioning the table and the paper in the Reference part of the revised manuscript.

6. The resolutions of figures in this manuscript should be improved, especially for the label and legends.

Response: We appreciate this suggestion and feel sorry for the inconvenience in reading. We have re-plotted the figures in the revised manuscript.

7. In Figure 2, the red scatter plots and blue ones overlap to a great extent, not very clearly expressing relationships between data. The readers may want some objective statistical data on the figure, like the correlation coefficient, which could be more intuitive to illustrate the relationships.

Response: We are appreciated for this comment. We agree that the red scatter plots and blue ones overlap to a great extent that does not clearly express relationships between data. To show readers the objective statistical data of the figure and make it more intuitive to illustrate the relationships, we have added correlation coefficient in both sub-figures.

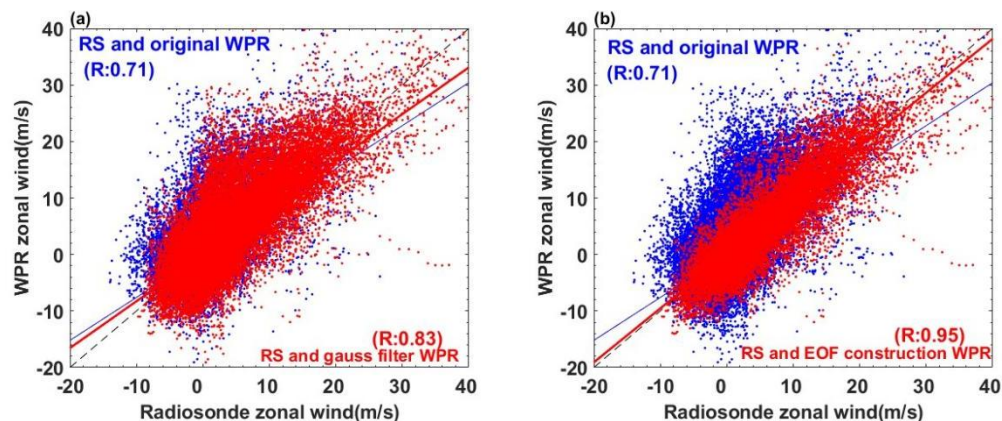


Figure 4: Scatter-plots for (a) original and Gaussian filtering (GF) WPR vs RS data, (b) original and empirical orthogonal function construction (EOFc) WPR vs RS data.

8. In 3.1, the authors should provide more in-depth analysis for data verification during different weather conditions, because as far as we know, wind profile radar observations may be influenced largely by the weather, rainy or not.

Response: Thanks for the valuable comment. To clarify influences of weather on wind profile radar observation quality, we added Figure 3 that includes scatter plots and vertical distribution of statistical parameters for WPR versus RS during rainy days and no rainy days. Between 1.5 and 4.5 km, WPR deviations during rainy days exceeded a little that without rain, and the RMSE and MB between WPR and RS were slightly smaller during rainy days than that without rain below

1.5km and above 4.5km. The correlation coefficient between WPR and RS with rain was a bit lower than that without rain. Generally speaking, precipitation could affect WPR observation quality, but the deviation distributions were overall the same during rainy and no rainy days, with slight differences on different layers. For details, please see Figure 3 and the corresponding descriptions in Line 242-251 of the manuscript.

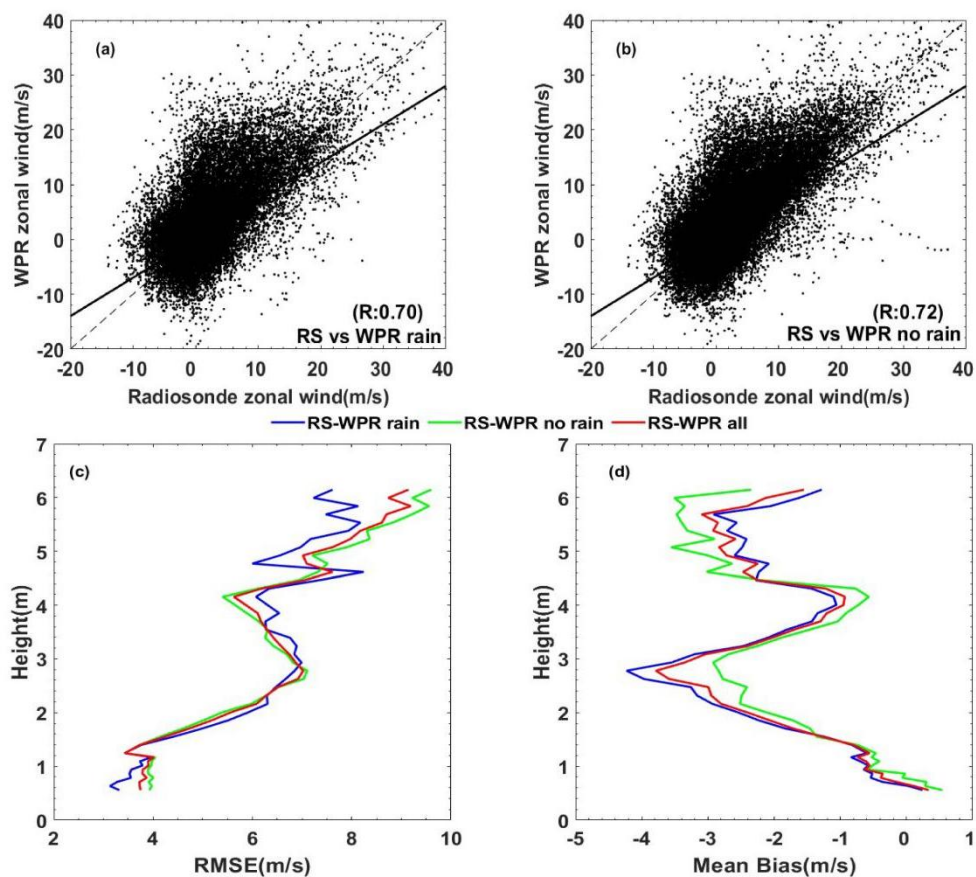


Figure 3. Scatter-plots for wind profile radar (WPR) vs radiosonde (RS) data during (a) rainy days and (b) no rainy days, and vertical distribution of (c) root mean squared error (RMSE) and (d) mean bias (MB) for WPR vs RS during all days, rainy days and no rainy days.

9. Line 213: “which drift more than 10 kilometers away from the releasing station”, the RS air balls may not always drift more than 10 kilometers away, but in the high levels with large winds, please modify the expression to make it more suitable.

Response: Thanks for this rigorous comment. We have modified the expression referring to Zeng et al. (2019) as “which can respectively drift as far as 0-90, 2-25 and <10km at 200, 500 and 850hPa away from the releasing station (Zeng et al., 2019)”, and added this paper for Reference in the revised manuscript.

10. Line 227: “The number of dots”? The authors might want to say “large numbers of dot ...”. Please make correction.

Response: We are sorry for this mistake, and have modified the sentence as “large numbers of dots...” in the revised manuscript.

11. Line 324-325: “at a height of 1km, the mean difference between these data was maintained within ± 1 m/s”, but it showed large negative deviations below 1.5 km in the figure.

Response: We are appreciated for this comment. It should be “the mean difference between these data maintained within ± 1 m/s from the heights of 1.5 to 8km”.

12. The paper has some strange expressions and grammatical mistakes in writing, which should be corrected. For example, there are some mix uses of tense. On lines 211-213, the first sentence is past tense, but the second sentence is present tense. Please check throughout the manuscript about this problem.

Response: Thanks for this valuable comments. We used past tense as the first sentence described a specific action, while present tense for the second sentence when it described an objective fact. However, there are some other mistakes in tenses. We have checked throughout the manuscript about this problem and made modification.

Sincerely,

Authors