

Dear Authors,

Due to the unexpected difficulty to obtain a second independent review, I will provide my evaluation of the paper as Editor / Reviewer. Such delays doesn't occur often and I should apologize for the time needed to close the discussion of your paper. Thanks for your patience.

I have read carefully the paper and, in agreement with reviewer 1, I find it highly interesting, well written and with a high pertinence to ACP scopes.

I have nevertheless a major issues that relates to the methodology of evaluation.

- (1) The comparison is limited to the month of March 2013 while MODIS data shows that April and May 2013 have high levels of AOD (dust) in the region. So it would be highly desirable to extend the period of analysis and provide a more structured presentation of the events that are included in the analysis period in addition to the snapshot of figure 1. This may improve the quality of the analysis as outlined below.
- (2) Moreover, a weakness is the demonstration of the improvement of forecast that is central to your analysis. I am convinced that limited additional work may improve the quality of the paper and its potential impact.

Few specific points:

- Figure 4 aims at showing a bias reduction. This is qualitatively discernible from color scale. Nevertheless, it would be more convincing to propose a quantitative table in addition to the time series of figures 6-7. A comment on why the spatial distribution of the improvement is desirable.
- While comparison with AERONET provides convincing outcomes, the one with CARSNET, as also stated by the authors is less discernible. Especially the expected increase in AOD related to the March 9th event that is almost not visible in the observations of figure 7. It is difficult to say whether improvement is achieved or not (e.g. look for instance at Tahzong site)
- A set of model maps from three experiments may be desirable here to evaluate where and how assimilation improves / modify the results.
- The method of comparison with the independent data may be better outlined. It is mentioned that all stations in a single grid box are considered. Are they aggregated ? averaged ?
- The effect of assimilation in forecasts, as expected, is less evident and limited in this analysis to histograms of figure 8. This is just partly evident from comparing fractional bias in the bottom line. A more quantitative statement would be desirable here. Moreover, also FGE would be interesting. It would also be useful to have time series. As said above, it would be much beneficial to extend the period of analysis.

- The improvement described in figure 9 for the Beijing area is not particularly striking. The authors states that higher values (less than 10%) of PM10 for experiment Modis DT+DB are due to the benefit of assimilating additional data.
- Conclusions may report a more through discussion on the system skills and limitations before stating in the last sentence about the “usability” of AOD forecasts

Minor (editorial) issues:

Page 2 line 18:

“2005ch is” → Typo ?

Page 3 line 23: please detail what CEPA is

Page 4 line 20: add the CAMS website where data are freely available. You may state it also in the acknowledgements

Page 5, 15: A sentence to clarify why the experiments where carried out at 80 km instead of 40 km and an assessment of the validity of results for both resolutions would be useful here

Page 9, 14: Sentence on Users and forecast time is not clear (it seems obvious that an improvement at T0+48 is useful) - Clarify – extend or skip it.

Page 9, Section 4.2: I guess the discussion refers to figure 8 – please refer to it.

Figure 7: please, use the same terminology for experiments in the caption

Figure 9: same as above