The AERONET Version 3 aerosol retrieval algorithm, associated uncertainties and comparisons to Version 2" by A. Sinyuk et al.

Reply to reviewer #1.

Authors would like to thank reviewer for careful reading of the manuscript and valuable comments.

1. **Page 6, line 193-194**: Please describe how high-performance multi-processor computing is utilized.

The sentence describing high performance computing was replaced by the following:

" The NASA Center for Climate Simulation (NCCS) at the NASA Goddard Space Flight Center (GSFC) Discover cluster is utilized to overcome the significant increase in computational resources required for the application of SORD in AERONET retrievals (https://www.nccs.nasa.gov/systems/discover)."

2. **Page 8, line 251**: what is meant by 'the effect of high range of instrument sensor head temperature'?

We modified the corresponding sentence as follows:

"In order to improve the overall quality of observations V3 employs a temperature correction of both AOD and sky measurements applied to account for the temperature sensitivity of detectors and filters of instruments under conditions of high sensor head temperature variability ~ (-25 to +55°C) in various environments. "

3. **Page 17, line 544**: Please justify why you make this the only choice as a proxy for the uncertainty.

We added the following explanation to the corresponding sentence:

"From these statistics only the standard deviation (which we label as U27) is used as a proxy for the estimated uncertainty as an indicator of a spread of the retrievals corresponding to the different combinations of input uncertainties."

4. **Pages 23-26**: It might be be of interest to mention which data will be reprocessed with the V3 algorithm and if there is a timeplan. Furthermore, are there any plans for further deployment of instruments that may use the HYB protocol?

We added the following paragraph at the end of the manuscript addressing these and some other questions.

"As of now the entire AERONET data base is reprocessed using V3 aerosol retrieval algorithm. The Level 2 U27 estimated are available at AERONET website (https://aeronet.gsfc.nasa.gov/cgi-bin/webtool_inv_v3) for each AERONET site. The number of new CIMEL Model-T instruments that can take measurements in HYB protocol is steadily increasing. "

5. **Pages 52-80**: In all Figures with two or more plots there is no a), b) (or c)) labels on the plots. Please include.

Included.

6. **Pages 56, Fig 6**: Please use same scale on y-axis on a) and b) to make comparison easier.

Corrected.

7. **Pages 69-80, Figs 19-21. 23-30**: These plots may provide more information if the points are colored according to the density of points, compare the left and right plots in Fig. 1 below. They show the same data, but information content is higher when plotted as in the left plot.

All the plots with high density of points were modified to add colored density, see example below:
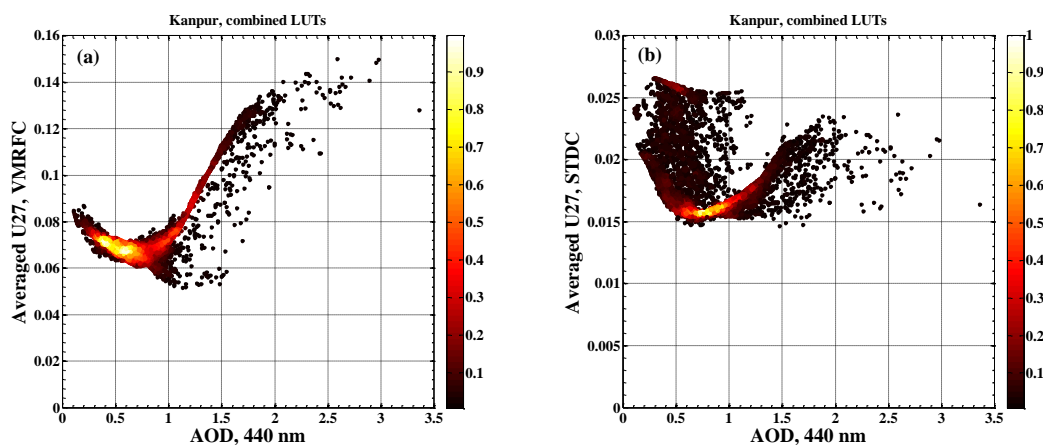

Figure 30. Uncertainties for a) volume median radius of coarse mode and b) width of size distribution for coarse mode estimated at Kanpur site.

8. **Language corrections**.

All suggested language corrections are incorporated.