Review of the manuscript entitled " ***Morphology, Chemical Composition and Mixing State of Atmospheric Aerosols from Two Contrasting Environments in Southern India"*** by Hariram et al., explored the possibility of analyzing the aerosol particles collected from two contrasting urban and rural sites in southern India for the mixing state using SEM-EDX. Although the results presented to be of some importance in terms of reducing the current uncertainties on the mixing state of aerosols while addressing their radiative forcing, authors need to clarify some important issues in this manuscript before it is reviewed again.

What is the significance of southern India in terms of radiative forcing of dust and black carbon compared to heavily polluted Indo-Gangetic Plain? What is the rationale of choosing these two sampling sites and how is relevant to extrapolate to other geographical locations in southern India? Some sentences are very hard to follow. I encourage authors to clearly state their objectives and overall implications in the manuscript. Why high volume air sampling is used for this study particularly when focussing on "mixing state"? How about the sampling artifacts when discussing the mixing state of aerosol particles as authors collected ambient aerosols from two contrasting urban and rural sampling sites in southern India on quartz fiber filters using high volume air sampler? When the ambient air is sucked, it can also be possible that on filter substrates the organic compounds and black carbon are externally/internally mixed and/or coated with other constituents of aerosols. Besides, the less number of samples collected (6 from each site) and unclear method description of within lab processing/handling of the filters as well as no section of quality control of methods presented here, I am not fully convinced that whether these results can be useful for further interpreting on the mixing state of ambient aerosols (dust/BC).

While SEM-EDX is used here to examine the mixing state of aerosols from the above two sampling sites, but the filter substrates used for this analysis is not appropriate for this kind of study. I wonder, why do authors choose quartz fiber filters for SEM-EDX analysis other than polycarbonate or Teflon filters (https://www3.epa.gov/ttnamti1/files/ambient/pm25/spec/RTISEMSOPFINAL.pdf). This is one of my major concern about the read further on the data interpretations of the manuscript. Also, quartz filters are made up of "SiO2" and traces of other elements like Na, Al. Therefore, when I looked at the outcomes of this research study, they listed that SiO2 is the base or core of the particles examined here and that too attributed to mineral dust origin. I wonder whether this SiO2 is from filter material or collected particles? Isn't this obvious that rural samples have relatively more enriched in dust and contain less carbonaceous components than urban samples? My another major concern is why the sampler was operated about 1.5m above the ground level (see page 2, line 33)? This means that the samples are not representative of even the receptor sites they have studied? How can authors' attribute such ground level collection of aerosols to the entire respective rural and urban atmosphere? Why only monsoon season is targetted here in this study?

L 13-15, P 2: Unclear, rewrite.
L 31, P 2: replace "far subdued" with "minor contributions from"

Overall, what is the major outcome of this study`?
Conclusions: 1) Particles of different shapes present in the ambient air.

L 13: Why the choice of only these two sites for examining the mixing state of aerosols other than the hotspot of air pollution from India?

L 34: Why samples were collected only during the summer monsoon season?

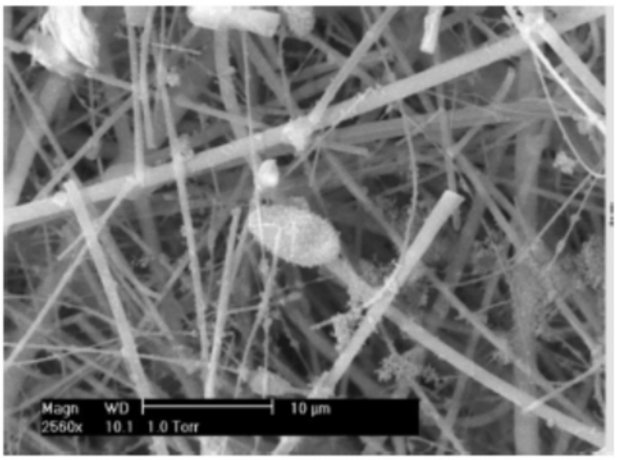
P 2, L 35: I could not follow what authors' trying to tell about? sampling duration is 6-8 hrs but the entire sampling activity is 2-3 days? Please rewrite.

P3 L 1: Separate samples collected for polluted hours of morning and evening also collected clean samples in the afternoon. This distinction seems rather vague. Out of six from Bengaluru, how many of them collected like this? pl. specify here within parenthesis.

P3 L4: Is this authors first time used this kind of equipment and method of study as stated in the abstract? If so, it is appropriate to give the actual details of how each sample has been prepared for the microscopic analysis on SEM-EDX rather than just pointing to somebody's reference. I would encourage authors to provide the necessary details that underwent in the sample preparation for SEM-EDX analysis. Also, state what kind of quality assurance is maintained to have confidence in the results presented here? Do authors run or check some intl' standards here. Mention here all how the blanks were taken during the collection? How different they are from the real ambient samples? Without all these details, the citations to other people work are not enough.

While going through the refs' cited in the MS, using the quartz fiber filters the main disadvantage is "Filters made of fibers have one main disadvantage: particulates can settle in the depths of the filter and in the mesh of the fibers (Sielicki et al., 2007)". In this review article, also stated clearly that the best substrate for SEM analysis is the polycarbonate filter. Therefore, I wonder whether this study made on quartz filters is meaning to interpret further on what the results pointed to and what implications they have for the accurate assessment of mixing state?

One image from Sielicki et al., 2007, showing the disadvantage of the quartz microfiber filters for the SEM analysis.



Author’s also showed the similar image?

Cynosure? Replace with another word.

L 30, P5: carbon coating percentage is estimated by excluding the carbonates? How this is done?

L 10, P 7: BLR1 was collected during rainfall? Is the BLR1 collected during a rain event? In which case, how this sample is dried and analyzed for SEM-EDX.