

Thank you for your comments. Each of your comments are followed by my replies (shown in Italics).

-Brian Magi

## **Anonymous Referee 2**

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The work of B.I.Magi presents data on mass concentration and optical properties of organic and inorganic species in southern Africa, a region with sparse previous measurements of this type. Rather than presenting any significant new scientific findings, the paper presents measurement data which are then compared to previous studies. However, given the sparse coverage of previous measurements in the location of the study, I recommend that a revised manuscript would merit publication subject to the following comments.

General Comments —————

The conclusions of this work rely wholly on proving beyond doubt the validity of the corrections, outlined in section 2, applied to the mass concentration measurements as a result of mis-calibrated flow meters. Unfortunately, the section is a little confusing to follow, principally owing to the various different species under comparison. I would recommend emphasising how the mass trends vary with the different species measured, and perhaps reiterating at points in the text which filters correspond to which species/previous study. This would help avoid frequent referral to Table 2 in order to comprehend the discussion.

*Many of the suggestions by both Reviewers addressed issues that detracted from the clarity of the arguments I made. I think my responses and subsequent changes to the manuscript improved the clarity.*

Critically, the first paragraph of pg13447 must be altered to replace the vague statements such as "roughly similar" with quantified versions. "Quite good" is not sufficient agreement when the remainder of the paper relies on the results presented here. If the author can alter the text to help lend weight to this argument, this would help enormously in the reader's confidence in their conclusions.

*The phrase 'roughly similar' is quantified in the same sentence when I compare 0.5 to the IQR of 0.5-0.7. Thanks for pointing out the vagueness in the paragraph. I changed the text to include the percent improvement in the comparison of G2003 filters (PM2.5, SO4, NO3) with E2003 filters. I also added the percent improvement in the ratio of mass concentrations from tropics and extratropics. I removed some sentences that distracted from the main point.*

Specific Comments —————

P13440 L6 - "major source of PM in s.Africa is BB" - as derived from satellites? Clarify which observations lead to this statement L15 - "26-27%", this is a very small range, how about "approximately 26%" ?

*I did not change the Abstract, but our Figure 1 and information from MODIS fire products alone would be evidence that the number of fires (25% of global fires) results in a huge injection of PM(2.5) into the atmosphere. The only thing I felt comfortable adding was 'as evidenced by numerous studies', but this seemed unnecessary in the overview I intended the Abstract to convey. I changed 26-27% to ~26%.*

P13441 L9 correct grammar is "aircraft on which the bulk of this study is based." L26 "usually" - quantify this statement. Which fraction of filters collected in tandem. %age is better than vague word like usually

*I changed 'on the aircraft on which the bulk of this study is based on' to 'referred to by K2003 and G2003'. Regarding 'usually', I deleted this word since they were always collected in tandem except for the 'simultaneous filter samples' in Table 3. Thanks for pointing that out.*

P13442 L2 - require citation for the inlet used on the aircraft. Is it the one used in the G2003 or K2003 studies? Please clarify. L5 - Request details, however brief, on the methods of analysis of the filters. For example "the teflon filters were analysed for speciesX..." would read much better as "the teflon filters were analysed by GC-MS for speciesX". The methods should be stated. L11 - do you mean the \*number\* distribution here? or mass? L17 - as L5 comment, better to put "E2003 used <method> to report mass concentrations..."

*I added a citation for the inlet. I added a brief reference to the specific techniques used to analyze teflon and quartz filters, and to the techniques E2003 used as well. In L11, I meant the number distribution and clarified this.*

P13443 L22 Don't feel last sentence in this para. is required L25 replace "Tropical aerosol properties have" with "Tropical aerosol distribution has"

*I deleted the reference to Seinfeld and Pandis. I changed the sentence on L25. Thanks.*

P13444 L9 presume the "total flow" is really an integrated flow volume? L10 \*\*\*MANDATORY\*\*\* Make/model of the flow meters, since they are absolutely key to this discussion L11 make model of the bubble meter L15 "altitudes" for "atmospheric levels" L28 was the flow meter really defective?? sounds like it was working fine, but un-calibrated.

*I corrected 'total flow' to read 'integrated flow volume'. I added the make/model of the flow meters used on the aircraft added. I do not know, and was not able to find in my notes, the make/model of the bubble flow meter. It was a hand-held bubble flow meter, but I just have no information about it. I changed 'atmospheric levels' to 'altitudes', and 'defective' to 'miscalibrated'.*

P13445 L13 append "as observed by satellites"

*Added, thanks.*

P13446 L9 "expected noise" - restate the magnitude of this at this point

*The uncertainty in filter mass due to handling was not well-characterized due to the issues in the integrated flow volume, but should be 10% at most. The simultaneous filters were mainly an exercise to double-check that the noise was minimal. I added a phrase to the text to give a rough estimate. There is no reason that the uncertainty due simply to handling would be greater than the 50% difference in simultaneous samples (Table 3).*

P13447 L 29 "every year" is really "August/Sept for the years 2001-7"

*Referring to Line 26, yes. I changed the text. It is notable that the burning in the tropics is higher than in the extratropics throughout the season (Jun-Oct).*

P13448 L8 prefer "similarity" in place of "lack of difference"

*Changed, thanks.*

P13449 Actually think the discussion would maintain more clarity without using SCA and ABS for acronyms

*I am not sure what you are suggesting in place of 'SCA' and 'ABS'. I left this as it was.*

L13451 L1 which properties of OC does the study summarise?

*Kanakidou et al 2005 start the paper by saying that they review the 'existing knowledge with regard to Organic Aerosol' and proceed to discuss this knowledge in the 71 pages of text that followed.*

P13464 Table 2. It would be useful to specify G2003 \*and\* K2003, and then clarify that the K2003 has a good cal., and that the E2003 was on an independent inlet. This would help the reader follow which values in the table are expected to be in error.

*Thanks. I clarified this in the Table caption.*

P13465 Table 3. I think writing "FlowMETER 1" etc would be clearer. In addition,

recommend to state (again) that, for example, Flow 2 corresponds to the quartz filters and has a good cal., and so on.

*Changed to Flow Meter and I added text clarifying which Flow Meters were good and bad.*