Dear Referee#2,

Thank you for your criticisms and suggestions to the manuscript. Most of the modifications suggested were considered in the manuscript and below are the comments to your questions/suggestions, which are now marked with **bold**.

P1C1. Please add which AOD this refers to [I assume 550nm?] and then for the rest of the text you can keep it simply as AOD.

- Wavelength is specified

P1C2.

- The preposition is removed

P1C3. This comment applies to all such numbers given in the entire text: I fail to understand how AOD might increase by 2% per annum, i.e. 20% per decade. A change of 0.006 in AOD per annum cannot represent 2% of the total AOD.
Please clarify exactly what you mean and alter accordingly in all locations in the text.
Also, it is vital that you add an error estimate in this trend. This estimate is provided easily by all major languages. Since this paper is based on the trend analysis, a simple error estimate on this trend has to appear. At least.

- If averaged for the tested period AOD is 0.3, then the annual increase of 0.006 is 2% of the mean AOD. In 10 years, AOD increase is 0.06, which is 20% of mean AOD. That means, that at the beginning of the period, AOD was ~ 0.27, while by the end of the period AOD was 0.33

P1C4. This seems enormous... please check and alter.

- Please, see my explanation above

P2C1. ca? please use full word.

- Replaces by “approximately”

P2C2. This is another major issue in my opinion, which has to be addressed centrally and will possibly alter major parts of the rest of the paper. How do you justify a linear trend on a time series that you have shown is made up of a clear positive trend, a plateau and a negative trend? the linear analysis on the entire series has absolutely no meaning. I suggest you rethink the focus of the paper and alter the entire text accordingly.

- Discussion on the whole period anomalies is removed from the manuscript.

P2C3. Re-write.

- See reply to P2C2

P2C4. as expected.

- Added

P2C5. A further issue I have with this analysis is why did you not deseasonalise the time series before performing the linear trends calculation, as is statistically appropriate. Please comment both here as well as in the text.

- Deseasonalisation was not needed since yearly averages were used to estimate inter-annual trend and seasonal aggregates for seasonal trends.

P2C6. Maybe also add information from a more generic review paper, for e.g. https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118682555.ch8

- The reference is added

P3C1. Three out of four of these are gases, unless you are referring to the particles, in which case, please re-write.

- The statement is clarified, references are added.

P3C2. Please provide references that testify that this period was a transitional one.

- The statement is modified.

P4C1. Was this performed with AOD estimates or AI estimates?

- AOD estimates, as mentioned.

P4C2. What did Su et al. find? if you do not add this information, then remove the reference, there is no point.

- The main findings are summarized.

P4C3. What is this acronym? add.

- Added.

P4C4. What did they show? which typical regions? you have to actually explain what the articles you reference are all about, not just mention them.

- The main findings are listed.

P4C5. As above, what did these studies show?

- The main findings are summarized

P4C6. Re-phrase this word. I think "here-after" is more modern.

- Re-phrased as suggested.

P5C1. Correct this reference to point to the appropriate ACP[D] paper.

- The reference is corrected.

P5C2. Please expand acronym here, since this is the first time you mention it.

- The acronym is expanded here.

P5C3. Either Section or Sect. [see line below] please correct according to ACP wishes.

- Corrected

P5C4. What does this mean? either expand a bit here or do not mention it at all.

- Short clarification added; more in Sect.4

P5C5.

- Removed, as suggested

P5C6.

- Removed, as suggested

P5C7. Update all such wordings.

- Updated as suggested.

P6C1. Move this explanation above, the first time you mention ADV [not in the title]

- The explanation is moved to Introduction.

P6C2. I fully understand that this is Part II of a two-part paper series, however some information is required so that the reader interested in this paper is not required to have Part I at hand as well. Two sentences should suffice and is not too much work to add.

- As you mentioned, Part 2 is a paper of a two-part paper series. Those papers are closely connected and the authors try to convince the reader to read the Part 1 first. Part 1 is already published in ACP. The main findings from Part 1, which are used in Part 2, are discussed in Part 2 in more detail. The ATSR temporal and spatial coverage is not a main conclusion from Part 1 which is further investigated in Part 2. Thus, we do not think that the more detailed discussion on the coverage is needed in Part 2.

P6C3. Are you sure this is statistically correct? should you grab all the daily values and average them into a season? in this way, all possible ~90 days of the season will have equal weight to the average. In your case, you are basically weighing the three monthly values, one against the other. Also, how were these monthly means calculated? was there a threshold imposed on the amount of daily values required to compute it?

- We grab all daily values and average them into a month. Seasonal value is the AOD averaged over 3 months. With that, each month has the same weight. We assume this is statistically more correct than to average 90 days of data into the season.

P6C3. Are these daily L3 datasets? monthly? please add this quite important information here.

- The important information is added.

P7C1. Again, I do not think that one should have to go to a different paper to find this rather important information. The location and choice of AERONET sites is important, as important as which AERONET data were used, level 1, level1b, level2? please add a sentence here on which AERONET sites this refers to.

- Here we just summarize the validation results. The location of the AERONET stations are marked now in Fig.2

P7C2. Please be more precise, what does close in time mean, 5 minutes or 1 h, for e.g.?

- Time is specified.

P7C3. If this main aim of this paragraph was to show the interconsistency of the two satellite datasets, I am sorry to say that you have not reached this goal. Re-phrase this paragraph and re-write adding more information, maybe you can refer to Weatherhead et al., 2017, https://doi.org/10.5194/acp-17-15069-201, as well.

- Part 1 was aimed to show the interconsistency of the two satellite datasets. The main conclusions from Part 1 are summarized in Part 2. We added the reference to Weatherhead et al., 2017

P8C1. Re-write this phrase, does not make sense.

- The phrase is re-written

P8C2. Please find a more appropriate title for this section.

- We think that the title fits well to the section, were we discuss the study area and explain the choice for the areas to be compared. We modified the map and moved the section up.

P8C3. Due to what? land cover? land use? please expand.

- The discussion is expanded

P8C4. Re-phrase.

- The sentence is re-phrased.

P9C1. The purple lines separating the regions do not show. Also, the figure in general is not very clear. I suggest you increase the resolution.

- The figure is modified.

P9C2. There is a question that arises that is not explained satisfactorily: how can one be sure that these are real trend differences and not inter-sensor algorithm differences that affect the trend? the bias between the two datasets, has it been examined? de-seasonalised? is it flat across the years or does it change? a longer discussion is needed here.

- The bias has been examined in Part I. Deseasonalisation was not needed, as explained in the answer to P2C5. The section is party re-written for clarification and better understanding.

P10C1. Main questions on the methodology:

1. **What do you do when the AOD values are too small, for e.g. 0.0001 and 0.0002, which results in a big, unreasonable, and unphysical corrective factor? do you have a threshold that you apply? explain.**

- The numbers you mentioned are too low and never considered. AOD accuracy, according to GCOS, should be within ±0.02. To avoid too high corrective factor, relative correction is introduced (eq. 4 and eq. 5) where the difference in AOD between ATSR and MODIS is scaled by the AOD.

2. **Why are you not weighing the AODs with their respective error estimates? or at least, the std?**

- We follow Sofieva et al., 2017 who makes the next statement: "different amounts of data available over time result in varying uncertainties over time, which might improperly weight the time series. The reference is added

P11C1. Surely you can spend 5 lines here explaining again. Please recall that Part I is not a published paper, hence one cannot simply reference such a document as if it were the absolute truth. You have to discuss these differences, in short, here.

- Part 1 is published. The sentence is modified by adding the main reasons for disagreement

P12C1. The titles within the graph, DJF, JJA, etc, are hard to read.

- Background for the seasonal titles within the graph is modified

P12C2. In this section, you definitely have to discuss the expected seasonal behaviour of AOD over China as well as the relative factors that affect it, are the dominant sources biogenic or anthropogenic, dessert dust, etc.

- This discussion is the main topic of Part I

P12C3. So, you have a clear steady mean bias of 0.1 on annual averages of between 0.4-0.5? i.e. a 20-25% bias?
I suggest you add a figure of monthly mean values before this figure and help discuss the differences of the two satellite datasets otherwise I am not convinces they can simply be "added as one" observational set.

- Seasonal maps for ATSR and MODIS AOD, as well as maps for difference between two instruments are shown and discussed in Part I. The results from comparison of the validation results is, in our opinion, a prove for the method suggested.

I suggest you take a long look at the reference list of Weatherhead et al., 2017, and draw knowledge from other similar works, for e.g. https://www.atmos-chem-phys.net/14/6983/2014/

- Thank you for providing the reference. Even though not referred to that particular manuscript, similar methods have been used in Part I to discuss the similarity in AOD from ATSR and MODIS

P13C1. You need to provide a reference for this statement and validation results.

- This statement is made in current paper as a conclusion from the results obtained by the authors.

P13C2. Re-phrase.

- The paragraph is re-written

P14C1. This is not shown in either Figs 5 and 6. Re-phrase or add Figures/statistics to support your statements.

- Reference to Part 1, supplement, is added

P14C2. This is not a scientific term, re-phrase accordingly.

- The whole sentence is deleted.

P15C1. This entire section feels completely out of balance with the rest of the paper and the aims of the rest of the paper. I suggest to the authors to remove it and keep it for another, more policy-oriented article they might write in the future.

- The changes in emission policy are only mentioned and not discussed from the political point of view. This short paragraph is needed, since the goal of the manuscript is to show that changes in the emission policy are seen in the AOD measurements.

P16C1. Are you using the word tendencies because you are analysing P2 which spans only 6 years and you do not wish to say trend?

- Exactly. Both periods are shorter than discussed in Weathrehead et al.,1988

P16C2. From this section onwards, I strongly recommend that the authors remove all results/plots/statistics/discussion on the WP. It cannot be accepted as viable statistically.

- The WP results are removed. The reason to show the WP was to compare the results with the other authors, who consider the longer period of 1-2 decades.

P16C3. It is impossible to see the green dots.

- The font for green dots was enlarged.

P16C4. This range, -0.1 to 0.1, is the magnitude of the bias between the sensors. How do the authors explain this and how can it be shown that this tendency is a real feature?

- The tendency is calculated for the combined dataset, where the bias between instruments is considered and corrected. The correction depends on AOD.

P16C5. How do you show results over the sea when you didn't use data over the sea, as you state in the relevant sections? please check.

- The results over sea is removed. The main reason to not discuss AOD over ocean was the luck of the validation points

P22C1. I strongly suggest you move this figure, and the associated discussion, before you discuss Fig. 7.

- In Fig. 7 we introduce the tendencies over whole China pixels-wise (L3) and show where the tendencies are significant. Then we compare AOD tendencies for selected regions. Our logic is to go for details (comparison between regions) after introducing the whole picture.

P24C1. This graph should also move further in the front of the paper. It is also rather too busy with all the values/statistics/asterisks etc.

- Please, see our reply to P22C1.

  We agree that the graph is busy but we consider that all information shown is complementary for better overview and the graph is readable. It will take some effort from the reader to read the corresponded numbers in the table.

P26C1.

- The statement is deleted.