

Second review of Wang et al. 'Quantifying light absorption and its source attribution of insoluble light-absorbing particles in Tibetan Plateau glaciers from 2013-2015.'

After a second review of Wang et al. it is evident that some improvements have been made to the manuscript. There are things remaining that need to be addressed however. Linguistics are one major obstacle. It appears that it was not thoroughly checked after the first review. Therefore, please go through this cumbersome process for your manuscript, as it sometimes hinders a correct reading of your manuscript. It also seems like some comments have been addressed with a correct response in the author's reply to the referee comments, but the necessary/appropriate change in the revised manuscript has not been done. Please check this throughout the manuscript (see also some specific examples outlined below). In the description section on the glaciers (2.1), there is still room for improvement. For example, elevations have been added for most glaciers, but I do not find any information if it is the starting point of the glaciers or the end-point. A range for where the glacier starts to the altitude where the glacier snout ends would be desired, if such information exists, as well as some estimate on the areas of the glaciers. The results section still would benefit from being synthesized in a more organized way. For example, I do not find the information on why there is no difference in ILAPs concentrations between the monsoon and non-monsoon seasons explanatory. Likewise, elevated concentrations of ILAPs in the surface of profiles would benefit from more structure, as it currently seems unorganized. Further, I did not find any comparisons of the results acquired here with other studies of ILAPs from the TP, as mentioned in the author's reply. Please see also page specific comments below.

#### Page specific comments

p. 3 lines 4-7: This is a good addition to the text. This sentence needs to be reworked however (past vs. present tense; did the reference come up with the number 30%, or where did it comes from?).

p. 3 lines 7-9: This sentence does not fit with the previous sentence. In a way it contradicts what has been said previously. Something along the lines that ILAPS have a major role in TP negative glacier mass balance, as well as temperature. This should be sorted out once the linguistics have been checked.

p. 3 lines 9-10: In this sentence, BC is introduced, whereas in the previous lines ILAPs is introduced. I would urge the writers to introduce BC as a part of ILAPs (as well as the other constituents of ILAPs) before diving into BC. As it currently reads, it is confusing and jumps from one thing to another.

p. 3 lines 18-20: Similar as comment above, I would introduce BC first and then provide this suitable reference to show where BC in the snow of TP comes from.

p. 3 line 23: mineral dust (MD) has already been introduced (line 15).

p. 4 lines 7-8: Please provide references for this statement.

p. 4 lines 10-14: Did all of these references provide source attribution in the snow? It is true that they reported ILAPs in snow and ice, but not source attribution.

p. 4 lines 22-26: This sentence needs to be reworked linguistically.

p. 4 lines 27-29: How can it be a snow survey when it was only ice sampled? Also, here I think you can highlight the uniqueness of your data, for example: have all of these 7 glaciers been sampled previous for ILAPs?

p. 5 lines 7-10: This sentence (or possibly sentences) could be more informative on what the AOD numbers imply for the areas investigated here.

p. 5 lines 10-12: Qiyi glacier, which classification scheme uses bucket-valley glacier? What does it actually mean with subcontinental according to physical characteristics? Please clarify what you mean 'with an elevation of 6178 m', highest point of glacier or lowest?

p. 5 lines 13-16: Xiaodongkemadi glacier, how do you know the average snowline and mean temperature there? Your own measurements or reference?

p. 5 lines 16-17: Yuzhufeng glacier, is the glacier actually on top of the mountain peak? Or does it start from the peak flowing down?

p. 5 line 18: Meikuang and Qiumianleiketage are located 'in' Kunlun Mountains not 'over'.

p. 5 lines 25-26: Hariqin and Meikuang have similar altitudes but are from different mountains? This sentence needs to be reworked. Which are the mountains?

p. 5 lines 26-28: Elevation range for Gurenhekou glacier?

p. 5 lines 28-30: I would argue that this sentence is added to the beginning of section 2.1 as it is an introductory statement. And is it actually enrichment of ILAPs that was studied? I would not argue that considering the results presented. How were the ice samples collected? Through drilling or?

p. 6 lines 11-14: I do not think my comments on the filters and filtering procedure in the last review (see major comments in last review) was adequately addressed in the revised manuscript section on the filtering. For example, how were the samples melted? 0.2  $\mu\text{m}$  refers to what on the filter? (pore size I assume?). It is good to have the reference to previous works on how the filtering was done, but I still feel like some essential information on the filtering should be included here as suggested above.

p. 7 lines 2-9: This sentence is very long, I suggest that it is shortened and it will also become more clear what the authors did.

p. 7 lines 12-13: The definition for  $C_{\text{BC}}^{\text{est}}$  is not clear, please revise.

p. 8 lines 8-9: Please write out how the calculations were done, even though it is in Doherty et al. 2014, I think it would be valuable for the reader to see it how you have done it.

p. 8 lines 9-11: Are these statements part of the optical analysis? Please place them in the appropriate section.

p. 8 lines 13-14: consists of instead of 'derived from'

p. 8 line 15: liquid instead of 'liquor'.

p. 8 line 25-28: Please clarify what you are saying in these sentences, it is not clear what this means.

p. 8 line 30: With it mentioned here, it is unclear if the samples for ICP-MS are filtered ice samples or not?

p. 9 line 16: What did the straightforward method entail? Would be good to provide more information on this.

p. 9 line 28: What are the anthropogenic sources? You give examples of natural, so please provide it for anthropogenic also.

p. 9 line 28: Write out the  $EF_c$  abbreviation.

p. 10 line 29- p. 11 line 2: You provide a higher range for glaciers in the northern TP, but not for the southern glaciers (and the lower range). Please be consistent.

p. 11 line 3-5: This statement is not part of the results, please remove and place it elsewhere if necessary.

p. 11 lines 12-15: The way the sentence reads now, it could be interpreted that the previous studies have found that ILAPs originated from combustion sources for this glacier, whereas I believe you want to say that due to your  $\Delta$  it indicates that the ILAPs come from combustion sources (and like others have indicated through their studies on  $\Delta$ ).

p. 11 lines 25-29: I do not see how these statements connect with the previous sentence and how they are relevant for the results discussion.

p. 11 line 30: Change 'feather' to feature.

p. 12 lines 4-7: This statement would be more useful in the beginning of the results section, since you then talk about difference between north and south.

p. 12 lines 9-11: This has already been mentioned in the beginning of the results section, please add it to that.

p. 12 lines 13-15: Is it actually local? How is that? What is the explanation for that?

p. 13 lines: 10-22: I do not see how this explains the non-existing difference between monsoon and non-monsoon seasons. Please reformulate.

p. 13 lines 28-30: This is valuable information that these samples were collected from the monsoon season, but I'm left wondering what it means compared to with other TP glaciers? Does it mean that your samples should be considered as high concentrations since they were collected during the monsoon? (although you have previously stated that you found no difference between seasons) Please elaborate on this for clarity.

p. 14 lines 2-3: I commented on this previously. I find it confusing the way it is written now, if concentrations are increasing from the top to the bottom, or vice versa. I believe Doherty et al. (2013) found that the concentrations were highest at the surface. Please carefully review and restructure this.

p. 14 lines 4-6: How were the profiles more complicated compared to other profiles? In the following sentences, I do not find an explanation on this. Please add the details or take it away.

p. 14 lines 11-13: This was commented on earlier and your response was sufficient. However, you have not changed this in the revised manuscript as it still reads that ILAPS are scavenged with meltwater and that leads to higher concentrations at the surface. If ILAPs are 'washed out' from the surface layer, it would lead to lower concentrations in the surface snow. Please review and clarify.

p. 14 lines 17-22: This discussion is interesting and is touched upon earlier in the manuscript (the argument from the previous studies for example could be introduced earlier in the manuscript. To me, it seems like there are profiles in this study where the surface layer is enriched with ILAPs and then times where this is not observed. Could this information that is scattered throughout the results be collected and made into a section that is thoroughly discussed and reviewed? (possibly its own section 3.2 or something similar). I think this would only make your data stand out more and would be easier interpreted by future readers.

p. 14 lines 26-28: What types of samples is this based on? Please clarify.

p. 14 lines 28-30: The first part of the sentence almost sounds like it is part of your own results. Please rephrase this statement.

p. 14 line 30- p. 15 lines 1-2: You are only referring to one study, so it is not 'previous studies'.

p. 15 lines 4-6: How do you interpret the ratios that you are presenting? Please add in the manuscript.

p. 15 lines 7-10: I do not understand how the previous sentences lead you to this last statement in this section (3.2). Please explain this further. How are you indicating this? The last part of the statement feels more like a claim to be put in the conclusions of the manuscript.

p. 15 lines 13-16: This was supposed to be removed and placed in your introduction according to your author's response.

p. 15 lines 16-18: I do not see the point of this sentence in this section. Please remove.

p. 15 lines 18-20: I would argue that fig. S7 is more informative and sums up the results better than fig. 7. Consider changing fig. S7 to the manuscript and putting the current fig. 7 as fig. S7. If this is done

please revise section 3.3 by referring to the median numbers presented in current fig. S7. Of course specific numbers could still be highlighted in the text and then referenced to in fig. S7.

p. 16 lines 22-23: This statement should be moved to conclusions.

p. 18 lines 4-8: How do these statements not contradict the arguments made in the 3.3 section, where dusts role is downplayed and BC is lifted up as the major light absorber? Please clarify these statements and synchronize the results.

Figure 1. The second half of the first sentence is redundant. Should not the wavelength information (I assume it is 500 nm?) also be included?

Figure 2. Pictures are always good, and a nice addition to the figures. But, as the text now mentions it is 'ice sampling locations' how about indicating in the pictures where the samples from each glacier were taken? These pictures could be considered to be placed in the supplementary materials.