

***Interactive comment on “Preliminary estimation of black carbon deposition from Nepal Climate Observatory-Pyramid data and its possible impact on snow albedo changes over Himalayan glaciers during the pre-monsoon season” by T. J. Yasunari et al.***

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Anonymous Referee #1

The paper “Preliminary estimation of black carbon deposition from Nepal climate observatory-Pyramid data and its possible impact on snow albedo changes over Himalayan glaciers during the pre-monsoon season”, co-authored by T. J. Yasunari, P. Bonasoni, P. Laj, K. Fujita, E. Vuillermoz, A. Marinoni, P. Cristofanelli, R. Duchi, G.

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Tartari, and K. –M. Lau, was reviewed finished. I have the following comments.

Major comments The work used the atmospheric BC and meteorological data at a high elevated site on the south of the Himalayas to estimate BC deposition and its impact on the surrounding glacier’s albedo and runoff. This is a bold try to research BC and its climate effects after its deposition in snow and ice, and provide a new method to understand the relationship between atmospheric particles and their deposits in snow, and would be useful for the future modeling. From this point of view, this work is worthy being published in the ACP journal after some minor revisions.

English presentation should be improved greatly.

>Thanks for useful comments and pointing out some revisions. We also hope our study will be helpful for future modeling works. We will answer to you point by point as follows. In addition, our paper was proofread by a native speaker at NASA Goddard Space Flight Center before re-submitting the paper.

Minor comments 1) P9291, The title of the paper is too long and should be shortened.

>YES, we shortened the title as “Estimated impact of black carbon deposition during pre-monsoon season from Nepal Climate Observatory - Pyramid data and snow albedo changes over Himalayan glaciers”.

2) P9293, the abstract. Line 6, “We estimated. . .” and line 11 “We also estimated. . .”, should be expressed as passive tense, which could be better. Line 21, “at similar altitude” should be “at the similar altitudes”.

>YES, we revised as you suggested.

3) P9295, line 3, “are few” should be changed to “are less”. Line 14-15, the briefs SHARE and ABC and their complete expressions should be changed in places where they first appeared in the text. Put the brief in the parenthesis in the first time as uniformed with the whole text.

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>YES, we revised as you suggested.

4) P9307, line 4-7, "Finally, Hansen and . . . old snow (Int/Old)". If change this expression to a table, that would be more concise. Line 14, delete "approximately".

>We included the following part in Table 3 as note: "Note: External mixture of BC with new snow (Ext/New), external mixture of BC with old snow (Ext/Old), internal mixture of BC with new snow (Int/New), and internal mixture of BC with old snow (Int/Old) were categorized by Hansen and Nazarenko (2004)." Then, the main part was shortened as follows: "Finally, Hansen and Nazarenko (2004) categorized BC and snow into 2 types of BC with 2 types of snow condition (4 types) (Table 3)." We deleted "approximately" at Line 14.

5) P9310, the second paragraph, this paragraph of text should be shortened, because many sentences in this paragraph are out of the discussion.

>Taking both comments (5) and (6) into account, we made one more section as section 3.7., and the main parts along comments (5) and (6) were combined together and summarized as "Suggested future studies on snow albedo over the Himalayas". This could be much clearer and conclusion parts were shortened. A description for Sect. 3.7. was also added in the last paragraph in Sect. 1.

6) P9310, Conclusions. The conclusion should be shortened and more concise. The last half of the first paragraph and the second paragraph are still like in discussion, other than conclusion.

>See above on comment (5). The last half of the first paragraph is important for closing remarks for future studies and we kept it.

7) P9328, Fig.8 is not necessary, since this work had not its own data, but cited from a reference.

>I think you were talking about Fig. 7 because Fig. 8 was based on the results from the numerical experiments in this study and these cases were not shown in the previous

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studies. For Fig. 7, if it is possible we would like to keep this figure because the comparisons among the regression equations and the equation by Ming et al. (2009) were not shown in the previous studies and we mentioned the relationship among these equations in the main part. In addition, this figure is easy for readers to understand the differences of the equations. Hence, we strongly would like to keep this figure.

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