

## ***Interactive comment on “Deposition of light-absorbing particles in glacier snow of the Sunderdhunga Valley, the southern forefront of Central Himalaya” by Jonas Svensson et al.***

### **Anonymous Referee #2**

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This is a solid paper, and of significant value to the community interested in deposition of light-absorbing non-soluble materials in snow, especially in a region with huge societal implications for glacier water. I have only one comment that rises above “minor”:

In supplemental material - the relationship between EC and TC is not well characterized as “tight correlation + random outliers”, but rather looks like “two separate tight correlations”. This indicates multiple populations of particulate with different EC:TC relationships, which is quite different than the single relationship that was assumed for the analysis (not only for estimation of EC in over-loaded filters, but also in terms of homogeneous behavior in different pits). I'd like to see this topic elevated to the main

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text with some more information for the reader - are the “outliers” randomly distributed in the pits/depths, or is there some rhyme or reason to their distribution? If they are truly random, I agree that it’s unlikely that the authors will be able to make use of them explicitly, but if not, they likely reveal some additional issues to be considered.

The rest of the comments are minor:

abstract - L25: please specify that they are within ‘2 km of each other L29: specify here if units are of liquid water equivalence or snow depth.

L 163 - please also specify the total number of filter samples. L 169 - Why is there an offset from zero? Are loadings high enough that this is negligible, or of no significance?

Figure 3- It seems more intuitive that the calculated ECacc (which is simply a scaling of liquid water depth) should be on the horizontal axis.

L239 : The main significance of the similarity of the ECacc to SWEacc seems to be in reference to the length-scales of variability in this region: they must be substantially longer than the  $\sim 2$  km separating the pits.

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1059>, 2020.

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