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Geoscientific Instrumentation Methods and Data Systems Discussions

Interactive comment on "Technical note: A low-cost albedometer for snow and ice measurements – Theoretical results and application on a tropical mountain in Bolivia" *by* Thomas Condom et al.

Anonymous Referee #1

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General comments

I have to say that I really enjoyed reading the paper. I believe testing new methods and techniques to reduce the gap in data availability on glacier energy balance is the way to go, specially because these relatively cheap instruments can support monitoring programs in many countries, where budgets are extremely limited and/or there are so many glaciers that even a large budget is not enough. Thus, I recommend this paper to be published. My (few) specific comments are intended for facilitating dissemination and correct interpretation of the findings from groups located in other places, not just

people working on the outer Tropics.

Specific comments

Page 7.L120. (also Page 14.L 243). Can you comment on the possible applicability of this instrument on calculating the same index in other regions where "hours" associated with these angles may be a little bit different? My impression is that the light sensor, although advertised as deployable in outdoors, was conceived for light measurements on more controlled environments, where the light source is between the limits described in the paper. I know that the authors suggest more studies at the end of the manuscript and I am not asking for a complete calculation of hours and days where this application would be ideal, but some notion of ranges could be good.

Table 1.- The same applies for the minimum operating range. There might be many locations where the -20°C is simply too high, as for example at the accumulation zones of mountain glaciers or whole glaciers in those located in sub-antarctic regions.

Page 14.L249 to Page 16.L283. and Fig 6. I wonder if it is possible to show the linear models for the individual land surfaces studies, i.e., bare soil and snow. My point here is that in 6A the cluster at the bottom (mostly bare soil?) might be influencing the slope for snow, which is the aim of the paper. In fact, reading the abstract (L.32) gives me the impression that this method works best for non-glacierized areas (r^2 0.83 versus 0.92). Another thing is perhaps including the error term in the equations of each plot; 6B seems to show a fairly consistent bias so perhaps in this case (for different snow conditions) a bias correction can improve the signal the authors are finding.

Aesthetic/Word choice suggestions

Page 2 L.26 and 31 (and other places where this word shows up), perhaps replace "Classical" for "Traditional"?

Page 2 L.29 and Page 13 L.235. To me "right hand side" is not a good way to refer to a location for the reader, because the point is actually located at the bottom of the map. I

suggest "the southern slope of the moraine arc (Fig 5)" or something along these lines.

Page 2. L.38. please reword "images showing the surface state of the glacier" (surface conditions?)

Page 5.L88, I suggest deleting the word "classical"

Fig. 1: I really don't see the black arrows.

Page 6.L112, the abstract says 0.26 instead of 0.3

Page 6.L115 "Figure 2" twice (even with a dot in between) difficults the flow of the document to me. I suggest changing the second "Figure 2" for "In that figure" or something similar.

Page 8. L142. I don't think "repartition" is the right word, perhaps "distribution"

Page 10.L166. I don't see where this parenthesis closes.

Page 10. L169-170. Suggest replacing "a cloud optical depth equal to 64" for "an optical depth of 64".

Page 10. L173-178, Wouldn't this explanation be clearer using equations instead?

Figure 4. It says theoritical instead of theoretical. Also, I think this figure is too small.

Page 20. L336-346. I feel this paragraph is a bit disconnected from all the previous text. I see no previous reference on snowline elevation or to precipitation behavior. Perhaps they need to reference figure 8 in this paragraph.

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