**Geoscientific
Model Development
Discussions**

# Interactive comment on "PRACTISE – Photo Rectification And ClassificaTIon SoftwarE (V.1.0)" by S. Härer et al.

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Dear Stefan Pohl, thank you very much for the careful reading of the manuscript and the helpful comments made. We want to note here that the revised figures can be found in the reply to the Anonymous Referee #1 as we want to avoid duplications. We address all mentioned issues here:

Question 1: [I]t would be beneficial to more clearly identify the improvement included in this software as compared to the earlier codes mentioned in the paper (i.e. Aschenwald 2001, Corripio 2004).

Answer: The Referee is right. We agree that we have to clarify and highlight the improvements of PRACTISE in the introductory as well as in the discussion chapter.

These are the implemented viewshed algorithm to hasten the processing, the DDS optimisation to account for a not precisely known camera orientation or camera movements, the choice between an automatic and a manual snow classification routine, the fast and simple processing of large time series and the flexibility of PRACTISE that facilitates the reader to easily implement other routines and thus adapt the software for the investigation of other research questions.

Question 2: I also agree with the first reviewers comments about the sometimes misleading terminology in regards to the use of the phrases projected and georeferenced. This should be changed.

Answer: This is absolutely right and we have replaced the word 'projected' by 'georeferenced' in sentences where it has been used by mistake.

Question 3: Page 174, L12 – The sentence should probably read: "PRACTISE also contains an automatic...." not "obtains".

Answer: Thanks for pointing this out. We will change 'obtain' to 'contain' here.

Question 4: Page 175, L1 – The authors mention that 2061 photographs were taken but also imply that some of them were not suitable for image processing. I think it would be beneficial for readers planning similar studies to know how many pictures had to be discarded and for what reasons.

Answer: We have mentioned that the difficulties with the automatic timer and the weather conditions have been the main problems in our study. In the revised version, we follow the Referee's suggestion and provide additional information, e.g. that about 180 days with at least one potentially suitable photograph for the analysis exist in the observation period.

Question 5: Page 180, L18 – The authors state "Different to Corripio (2004), we reduce the 3-D problem ($P_{cr}$ to $P_p$) to two 2-D problems; a horizontal ($P_{crx}$ to $P_{px}$) and a vertical ($P_{cry}$ to $P_{py}$) one." The authors should probably explain why this was done, or

more importantly what the advantage is.

Answer: The 3-D version has some numerical inconsistencies which were deleted by using the 2-D approach.

Question 6: Page 184 – Although this issue was already mentioned by reviewer 1, I would also strongly recommend adding further discussion about the DDS optimization. This "optional" procedure improves the photo processing in the test area to a great extent. Is this likely the case for most situations or was there something unusual about the test location that lead to this?

Answer: The DDS optimisation is absolutely necessary in our study as we estimate the exterior and interior camera orientations e.g. by deriving the camera location and the principle point using an orthophoto which results in an uncertainty of several metres. Further, we apply the optimisation using GCPs to account for camera movements during the observation period. We will highlight this special situation and explain that this feature is especially valuable for the analysis of large time series. If, on the contrary, the camera parameters are precisely known, the DDS optimisation is not necessary as no improvements will be possible. We will clarify the circumstances where the DDS optimisation is needed or not in the revised version.

Question 7: Page 185, L10 –The snow cover extent taken from the photographs is given in ha, which I find unusual especially since other area sizes are given in m2 (compare the previous page). I'm also not entirely certain whether the mentioned "investigation area" black dotted line in Figure 10 is identical to the "test area" depicted by the black box in Figure 9. Please clarify.

Answer: Thanks for pointing this out. We will recalculate the snow cover extents from ha to $m^2$. We will add a description in the caption of Fig. 9 to clarify that this small test area is depicted by the black box (solid black line). The black dashed line in Fig. 10 however shows the complete investigation area of the Schneefernerkopf for all photographs. We will clarify this in the figure captions of Fig. 9 and 10.

Question 8: Fig. 1 – The legends and scales are hard to read. The Figure caption seems exceptionally long. I think information about the spatial resolution of the DEM, the date of installment, and the time interval set is contained in the text and could be removed from the Figure caption.

Answer: We thank the Referee for these useful comments and will enlarge the legends and scales. Further, we will shorten the figure caption and skip the suggested parts.

Question 9: Fig. 8 – The choice of colours make this Figure and the similar graphs in Figure 9 a little tough to read. The blue line is very hard to see against the backdrop of the blue-green bars. Also the font for the axis labels and titles has to be bigger.

Answer: The font size of axis labels and titles will be enlarged in this figure. Further, we will change the colour of the line from blue to black in Fig. 8a and Fig. 9a-c to simplify the differentiation.

Question 10: Fig. 9 – This Figure has to revised completely. The axis legends and titles are not legible, why are the plots of RGB values superimposed on the photographs and what is depicted in Figure d. I assume it is the manual classification of the August picture but the caption is missing. Also you might want to show that Figure right after the initial August picture (b) which would probably make it easier to compare the two.

Answer: We agree with the Referee here and will obviously enlarge the size of the fonts and zoom in the photographs to give the reader an opportunity to visually investigate the quality of the classification. We will additionally add the reference to panel (d) in the caption. The order of the images of the automatic and the manual classification algorithm will also be rearranged to allow the reader to easily compare the different classifications, in particular the difference in the small test area (black box). Finally, we will change the superimposition of the histograms on the photographs in the revised version.

Question 11: Fig. 10 – Why are only 3 of the 4 snow cover extent calculation made

and shown in Figure 9 shown in Figure 10? Would it make more sense to show all 4, especially since this would show the readers once again any potential differences in the resulting snow cover extent between the automatically and manually classified August image.

Answer: We see the Referee's point here. However, we think that showing the automatic classification of the August image does not give the reader additional information as there is no possibility to compare it with the photograph anymore. In our opinion, it is more important that we ensure in the revised version that the reader can visually investigate and thereby compare the automatic to the manual classification approach directly. Hence, we will change the order of the figures and give an enlarged view of the photographs in the Fig. 9a-d. This will give the reader the opportunity to detect any changes and no additional snow cover map of a classification that h

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