**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 Michael Spencer, thank you very much for the comments in order to further improve the manuscript. We want to point out that all revised figures can be found in the response to the comments of the Anonymous Referee #1 as we want to avoid duplications. All comments are answered in the following:

Question 1: It would be good to see a more in depth discussion of limitations, with these mentioned in the abstract

Answer: A discussion of limitations of existing software packages utilising terrestrial photography can be found in the introduction. The innovations and advantages to overcome the mentioned limitations will be highlighted according to the replies to questions

6 and 7 of the Anonymous Referee #1 and to question 1 of Stefan Pohl in the introductory, as well as in the discussion chapter. The possible difficulties in the snow classification using RGB photographs are already thoroughly described in the discussion. The limitations of using a common single lens reflex camera and by deriving the camera coordinates from an orthophoto in our study will be clarified in the data chapter of the revised version. We do not mention any limitations within the abstract.

Question 2: There is no mention made of the software run-time per photograph

Answer: We use computing power similar to an Intel Pentium 4 with 3GHz, the runtime per photograph is about 40 seconds in our study, i.e. all optional routines are switched on, i.e. the implemented viewshed algorithm, the DDS optimisation with 3000 iterations and the automatic snow classification. The used data are the DEM raster with the size of 3014x1783 cells and the photograph with 17.9Mpx. We will add the run-time to section 4 of the revised manuscript.

Question 3: Consider which parts of a figure are important and make these bigger

Answer: Thanks for this useful comment. We will zoom in the photographs of e.g. Fig. 9a-d to the study site of Schneefernerkopf leaving the glacier area of the skiing resort out. Additionally, the figure size as well as titles and axis labels will be enlarged and the legibility will improve.

Question 4: There are two referenced Corripio papers from 2004, define which is discussed in the text (a/b)

Answer: The Referee is right, there are two referenced Corripio papers from 2004. In one of them Corripio is the main author with several co-authors, we refererenced this with 'Corripio et al. (2004)'. The second paper referenced here, Corripio wrote without any co-authors which we reference as 'Corripio (2004)' in our manuscript. Hence, we do not see a reason to additionally reference them with 'a' and 'b' here.

Question 5: As with other reviewers, tidy up the use/descriptions of GCPs. It is con-

fusing to say they aren't needed, and then use them in two different sections (one optional).

Answer: We thank the Referee for once again highlighting this issue. According to the reply to questions 7 and 8 of the Anonymous Referee #1 and to question 6 of Stefan Pohl, we will clarify in section 1, 2, 3.3 and 4 when GCPs are necessary. Hence, that we need them in our study and that we make use of 6 GCPs. Further, we will clearly point out that if all camera parameters are precisely known, the additional GCPs are not needed for the georeferencing as we use the approach from Watt and Watt (1992) which is utilised in computer animation and rendering. These comments will give the reader a guideline whereupon each user can decide if the DDS optimisation is optional or mandatory on a case by case basis.

Question 6: Section 1, L5-18 – consider using bullet points for this list to make reading easier

Answer: The usage of bullet points would compartmentalize the text. This would be difficult because it is not just an enumeration but a lot of additional information is also given. So we would prefer not to include bullet points

Question 7: Section 2, L6 – 'are determined using longitude and latitude' this is ambiguous, was a GIS used and long/lat ascertained? –'altitude derived', clarify this. Presume you mean PRACTISE takes altitude from corresponding dtm pixel?

Answer: The Referee is right. We will clarify this sentence in accordance to the reply to question 24 of the Anonymous Referee #1 in the revised manuscript. Thus, it will be highlighted that only the longitude and latitude of C and T have to be given as input in PRACTISE while the altitude is derived from the corresponding DEM pixel during the processing.

Question 8: Section 2, L24 – 'DEM had a spatial resolution' presume this is x,y?

Answer: Thanks for pointing this out. The spatial resolution refers to the x- and y-

coordinates of the DEM space. We will clarify this in the revised version.

Question 9: Section 2, L27 – Why are GCPs needed? This seems to contradict P173 L28/9

Answer: As we have stated in the reply to question 5 before, the additional GCPs are necessary for the DDS optimisation where they are used to improve the exterior and interior camera orientations. We will highlight that this processing step is needed in our study as we only estimate the orientation parameters of the camera and additionally, the camera is slightly moved on several occasions during the observation period. However, users that have input data that has been accurately measured for each of the photographs do not need any additional GCPs. We will clarify this in the revised version.

Question 10: Section 3.3 – GCPs used earlier in paper

Answer: We are not sure what the Reviewer's intention of this question is.

Question 11: Section 3.3, L24 – define 'good results'.

Answer: We do not want to repeat the findings of Tolson and Shoemaker (2007) in detail, but: The DDS optimisation is producing similiar good results or even outperforms the frequently used shuffled complex evolution (SCE) optimisation if the number of function evaluations is limited e.g. between 1000 and 10000. This is valid for multiple calibration problems between 6 and 30 dimensions. We will add a sentence that clarifies the term "good results" here.

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