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Geoscientific Model Development Discussions

Interactive comment on "PRACTISE – Photo Rectification And ClassificaTIon SoftwarE (V.2.0)" *by* S. Härer et al.

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Dear Juraj Parajka,
Thank you very much for the careful reading and the comments in order to further improve the manuscript and the source code. We are happy to hear that you enjoyed reading our study. Before we will address all your comments we want to note here that the source code of PRACTISE V.2.0 was updated within the revision and hence, the version number changed to V.2.1.

General comments:
Comment 1 of Referee:
The calibration of the NDSI threshold is a nice feature, however the extrapolation of this

threshold to larger areas is not clearly discussed. There is a gap between the spatial scale of digital photographs and continental or global satellite snow cover products. The results clearly show some temporal differences in the estimated threshold, but one would expect also similar differences in space. Please consider to discuss more the limits of the extrapolation procedure and give some recommendations to what spatial scale it is still possible to extrapolate the results with a good accuracy.
Authors' response:
We see the Referee's point here and we agree that the NDSI threshold might not only vary temporally but also spatially. However, this study focuses on the functionality of the new PRACTISE software including the new concept of NDSI threshold calibration in satellite images and the found temporal variability. This is shown for the Zugspitzplatt area where the NDSI threshold is constant for the investigated dates. We understand the need to test the possibilities and limits of extrapolating the calibrated threshold to fill the gap between small catchment sizes of several square kilometres and continental/global scales but this is not possible with this experimental setup and hence, out of the scope of this paper. We will highlight this aim in the outlook for future research as we are as interested in this topic as the reviewer. We therefore also started to work on the spatial comparison of NDSI thresholds on the regional scale using our software.
Authors' changes in manuscript (p. 8500, line 24 to p. 8501, line 4):
Our next step will be to apply PRACTISE and the integrated new approach to the complete available time series of photographs and satellite images in the Zugspitzplatt area. In addition, we will process another long-term time series of photographs in the also alpine Vernagtferner area, Austria which is located in the same Landsat scene as the Zugspitzplatt. We think that this experimental setup will be a first step towards understanding the temporal variability of the calibrated NDSI thresholds. Furthermore, the setup will also allow to test for spatial representativeness of the optimal NDSI threshold on the regional scale as this is another topic of ongoing discussion. This becomes especially important as the spatio-temporal extrapolation possibilities and

limits of the presented method are as yet unknown. Further research will also be necessary to verify if the synthesis of terrestrial photograph and satellite image is applicable in a modified form to other research fields like thermal photography and satellite imagery.

Comment 2 of Referee:
According to the GMD guidelines, the model description paper has to clearly indicate the model web page URL, the hardware and software requirements. Please consider to make this information more complete in the manuscript. Are there some restriction regarding the Matlab version?
Authors' response:
We agree with the reviewer that the information on code availability, hardware and software requirements and the Matlab packages could be extended and clarified. We will add the maximum memory use of 1.2 GB for the PRACTISE run described at the end of section 3.3 (p. 8496, l. 18 ff.). Further, we will state in the code availability section of the revised manuscript that the software can be run on any Windows or UNIX computer with at least 2 GB RAM where Matlab can be installed. We will also mention that PRACTISE only needs a basic Matlab license without additional packages and that the code has been tested for compatibility with Matlab versions from 2005 and 2015. At last, we will add a model web page URL to this section which we prepared on GitHub and where we will also offer future updates of PRACTISE.
Authors' changes in manuscript:
p. 8496, line 16-22: Final outputs of the described PRACTISE run are snow cover maps based on the SLR photography and Landsat Level 1 data, a Landsat NDSI map and the computed viewshed. The runtime of PRACTISE V.2.1 for this setup with a photographed area of about 0.3 km^2 and a Landsat processing extent of 30 km^2 was about 58.6 s on an Intel Core i7-2600 CPU with 3.4 GHz utilising 1.2 GB of memory (RAM). However, interactive modes were deactivated in the runtime measurement and hence the optimisation of camera parameters with 3000 iterations (~ 0.58 s) was

executed only once.
p. 8501, line 6-9: Please see comment 4 here.

Comment 3 of Referee:
The comments in Matlab source code (e.g. PRACTISE.m file) do not always clearly refer that this source code represents version 2 of the software. Please consider to update the comments to make it clear, particularly for users that use also the older version.
Authors' response:
Thank you for pointing this out, we corrected the version number in the comments of the source code.

Comment 4 of Referee:
This is not a suggestion for revision, just a comment. It is a pity that the software is Matlab-based, so it is dependent on licensed commercial software. A fully open source code (e.g. in R, or GRASS environment) would be potentially more attractive alternative.
Authors' response:
The Referee was not alone with this comment. The Topical Editor Rolf Sander also proposed to make the code executable in an open source Matlab alternative called GNU Octave. We therefore invested some time and changed the code so that in case a user does not have a Matlab license he/she can still execute and adapt the code for his/her own purposes. We want to highlight that the algorithms and calculations themselves have not been changed but as the code changed we renamed the PRACTISE version to V.2.1. PRACTISE is now executable using Matlab on Windows and UNIX machines as before and additionally using (64 bit-enabled) Octave 4.0 on Linux platforms. We want to note here that the code is not executable using Octave 4.0 for Windows at the moment. The reason for that is that no precompiled Octave

64 bit-version for Windows is available yet but this is necessary for processing the large arrays in PRACTISE.

Authors' changes in manuscript (p. 8501, line 6-9):

The current release of PRACTISE V.2.1 is distributed under the Creative Commons license (CC-BY-NC-SA 4.0) and together with a manual and an example dataset for Windows and UNIX platforms available online here.

https://github.com/shaerer/PRACTISE/releases/tag/v2.1 (DOI:10.5281/zenodo.35646)

The software is executable on any Windows or UNIX computer with a basic Matlab installation and at least 2 GB RAM. This means no additional Matlab packages are needed. Additionally, the current version of PRACTISE is also executable on Linux platforms using (64 bit-enabled) Octave 4.0 and higher, an open source alternative of Matlab. The code has been tested for compatibility with Matlab versions from 2005 and 2015 (both Windows 7) as well as Octave 4.0 (Linux Mint 17.1 and Ubuntu 14.04). We want to note here that the code is not executable using Octave 4.0 for Windows at the moment. The reason for that is simply that no precompiled 64 bit-version of Octave 4.0 is available for Windows yet which is though necessary to process the large arrays in PRACTISE.

Interactive comment on Geosci. Model Dev. Discuss., 8, 8481, 2015.