

## ***Interactive comment on “On the need of a time and location dependent estimation of the NDSI threshold value for reducing existing uncertainties in snow cover maps at different scales” by Stefan Härer et al.***

**Anonymous Referee #1**

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On the need of a time and location dependent estimation of the NDSI threshold value for reducing existing uncertainties in snow cover maps at different scales

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The authors present an interesting study focusing on measurement of normalized-difference snow index (NDSI) using ground-based photogrammetric methods. They take a relatively newly developed methodology (PRACTISE v.2.1: previously published by the authors in GMD) and apply it to two high elevation catchments in the Euro-

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pean Alps to estimate very high resolution (1m) NDSI. These high-resolution outputs of PRACTISE are then compared to lower resolutions (30 to 990 m) to compare with Landsat and MODIS imagery, amongst other potential satellite products. This is a very worthwhile study as the eventual application of this technique across multiple high mountain basins could provide essential information about the rate of decrease in mountain snowpacks in a warming world.

While the main thrust of the scientific messages are understandable and important, there remains some more work that needs to be done to increase the clarity of the argument. I make the following suggestions for consideration that I hope would benefit the paper.

1. The current manuscript introduces the application of PRACTISE, but does not provide a detailed enough description to be able to fully understand how it works. Considering there are already two detailed papers on PRACTISE by the authors in GMD, I would hope citations to them could provide the reader with a satisfactory description. Then this manuscript could be refined to provide more focus on the results of the RCZ / VF comparison, and greater detail on the scaling question. Figures 2 through 5 could be removed to focus more on the results of this study (Fig 6 through 9) and expand analysis around figure 10 – which is of great interest, but under-analyzed in the current manuscript.

2. The comparison between RCZ / VF is robust and well quantified (Fig 7). The influence of rock reflectance is well described (Fig 8) and provides a valuable process basis to the quadratic relationships (Fig 9). However, the scaling question, while well illustrated by the example of 16 September (Fig 10a), suggests that all data have been used to create relationships presented in (Fig 10c). How was Fig 10c constructed and what does the ‘cumulated probability’ mean in this context? Can you show that the increase in the identical nature of snow cover maps is not simply a function of decreasing number of snow maps pairs (again this links to greater clarification as to what is meant by cumulated probability). If this relationship is statistically robust, could more

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be made of this message, as understanding the influence of measurement resolution by satellite imagery is important to understanding the fate of snow and ice in small glacierized basins.

3. Currently there are deficiencies in the terminology and language used throughout the manuscript. These require detailed attention. A non-exhaustive list of examples can be found below:

Pg1, ln19 – Quantify how different the statistically insignificant correlation was to the standard threshold.

Pg1, ln20 – what is the ‘another literature value’? State it here.

Pg1, ln 21 – replace ‘case’ with ‘cases where’.

Pg2, ln5 – ‘precipitation water’ – just say ‘precipitation’?

Pg2, ln 10-13 – avoid single sentence paragraphs. Change this throughout the manuscript.

Pg2, ln28 – ‘In this context’ is superfluous and could be removed.

Pg3, Ln 23 – ‘built up’ is poor terminology for geological composition

Pg3, ln 25 – ‘pending’ is strange terminology. Do you mean ‘underlying rock’ or ‘substrate’

Pg3, ln 29 – no need for ‘for’ in the statement ‘guarantees for comparable’

Pg4, ln 1 – do you mean ‘dates’ rather than ‘cases’? Stick to constant terminology.

Pg4, ln 4 – is ‘rectificaton’ as spelling error?

Pg5, ln 1 – no need for ‘It has to be mentioned that’

Pg5, ln 22 – remove ‘an’

Pg5, ln 30 & 32 – remove ‘used’

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Pg5, ln 32 – ‘misclassified’ is misspelt

P6, ln 4-6 – tenses are used interchangeably. Suggest sticking to past tense consistently throughout the methods section

Pg6, ln 9 – remove ‘thereby’

P6, ln 13 - no need for ‘It has to be mentioned that’

Pg7, ln 10 – what does ‘underline’ mean in this context, I think the wrong word is being used here.

Pg7, ln 20 – if statistically significant, then present the stats here (r-value and p-value).

Pg8. Ln 17 – remove ‘in percents’

Pg8, ln24 – what chose a threshold of 0.7? Provide some justification.

Pg10, ln 11 – what is a ‘date by date transfer’?

Pg10, ln 23 – ‘jeopardous’ is probably not the correct term to use here. ‘inappropriate’ or something similar may be better.

Figures: Use of titles within figures and sub-figures is unnecessary (e.g. above each sub-figure in Fig 7). Instead use the associated caption to clearly describe each figure. Often current captions are a mix of methods and results, rather than sticking to the bare minimum need to adequately describe what is presented. The main body of the text should instead be used to explain methodological procedures and results.

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