

The Cryosphere Discuss., community comment CC2
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Reply on RC2

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Community comment on "Spatiotemporal distribution of seasonal snow water equivalent in High Mountain Asia from an 18-year Landsat–MODIS era snow reanalysis dataset" by Yufei Liu et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-139-CC2>, 2021

We greatly appreciate the reviewer's comments, and will provide more details in our formal response, but wanted to provide brief clarifications and/or justifications online for some of the major points to aid in the review process.

The reanalysis method is designed to work best for seasonal snow where there is a strong signature between snow disappearance and measured fSCA. Therefore we provide the caveat that non-seasonal snow pixels are likely significantly more erroneous than the seasonal snow pixels (and not the target of this methodology). The use of a non-seasonal snow mask is used in this paper to highlight the parts of snow storage that are deemed seasonal snow. In the raw dataset, all pixels are provided and so users are free to take advantage of the non-seasonal snow estimates, but for the purposes of highlighting a new estimate of seasonal snow climatology in this paper we prefer to focus on seasonal snow alone.

More discussion will be provided on the impact of clouds and fSCA measurement in the revised manuscript.

It is acknowledged that the reanalysis method is best designed for non-ephemeral snow where there is a strong signal between snow disappearance and measured fSCA that can be captured at the frequency of the fSCA measurements. Hence it is not surprising that ephemeral snow is not necessarily well captured.

The low snow albedo values are a result of daily averaging of snow albedo in generating the output files where the no-snow albedo is stored as zeros. The (modified BATS) snow albedo model used in the reanalysis limits snow albedo to values between ~0.4-0.95. However on days where snow disappears/appears within the day there will be a mix of zero and sensible albedo values that when averaged can lead to what appear to be values that are too low. Hence, those days with snow albedo values should likely be ignored in any analysis. This will be clarified in the revised manuscript and/or data documentation.

See comment in response to Reviewer #1 (regarding amount of analysis and whether this is more of a data paper), repeated here: The paper was originally conceived primarily as a "data paper" to emphasize the new dataset that focuses on seasonal snow over HMA. It was submitted to Earth System Science Data (ESSD) where we were told it was out of scope because it had "too much analysis" due to the inclusion of analysis of the space-time climatology of seasonal snow. Admittedly, this places this paper somewhere between

a typical data paper and research article that uses existing datasets. The rationale for not including additional analysis is to maintain this paper as primarily a standalone description of a new estimate of seasonal snow climatology over HMA. Including additional analysis through an intercomparison lens will not only push this paper over the length limits, it will likely require giving short shrift to both this new dataset and the other datasets included in the intercomparison. The intercomparison paper we are currently drafting is easily a standalone paper itself and therefore merging the two will, in our opinion, water down both sets of material. Hence our preference is to keep this paper short and to the point in terms of providing a new estimate of seasonal snow climatology, while pointing the readers to the new dataset where further analysis can be performed. We will propose inclusion of additional meaningful analysis in the context of the dataset climatology in the revised manuscript.