

The Cryosphere Discuss., community comment CC1
<https://doi.org/10.5194/tc-2022-227-CC1>, 2022
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Comment on tc-2022-227

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Community comment on "Implementing spatially and temporally varying snow densities into the GlobSnow snow water equivalent retrieval" by Pinja Venäläinen et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2022-227-CC1>, 2022

This article presents a new version of Globe Snow v.3.0 (new product) including a retrieval with variable density. The principle of the approach has already been presented and discussed by P. Venäläinen in TC 2021. In this paper, the improvement is described and analyzed over a larger dataset.

Even if the retrieval of SWE including a variable density in the inversion process improves the SWE a bit (reduction of the bias by 5% on average), the lack of sensitivity of the retrieval for large amounts of snow (SWE>150 mm) remains a major problem with this approach (Fig. 8). This should be recalled in conclusion, even if it is known.

But this long database has the merit to exist and has to be kept up to date.

Some aspects to be clarified (specially Fig. 2):

Abstract: reduced RMSE and MAE by about 4 mm and 5 mm : in %tage?

L.94 For GMON too, the snow density was calculated for SWE and snow depth? But snow depth is not systematically measured at the GMON sites?

L. 170 Figure 2. Not clear : The "Dynamic snow density information" is derived from Tb (a red arrow is missing?) and from Step 2 : the upper arrow should go the other way?

L. 380 The figures show the SWE retrievals. Wording of the caption not clear: may be confused with "snow" density scatter plots ! To reword more clearly?