

The following two comments in CC1 requires further consideration.

o **Comment:**

In fact, the biases on individual glaciers, including some of the large ones, may be significantly higher than the mean quoted in the text (L257). The biases are not discussed much except giving a mean bias, which is going to be small because of the oscillating sign. Could you check the mean absolute bias? A clear systematic bias also shows up in Fig5 , with the model overestimating melt wherever the observed melt is less (more negative) than -2 m/y. This bias and its effect on the model output, which are completely ignored, are likely to be significant, particularly on the extreme years, and demand a thorough analysis.

Response:

Unfortunately, we do not exactly understand the reviewer's concern here. In the text both the bias and the mean absolute difference (i.e. accounting for the oscillating sign) are shown and discussed.

Furthermore, both the results shown in Figs 4 and 5 do not indicate any systematic skew towards higher model misfits at very negative mass balances in our opinion. As all results are clearly presented for the inspection of the reader, we would not see what additional analysis could be performed here.

Of course, we acknowledge that for some glaciers, the disagreement can be substantial. For example, for Plaine Morte and Basodino, there's a model error of more than 1 m w.e. in one individual year (see Fig. 4b). But we feel that it is not possible to specifically discuss every individual data point, given that the overall statistics are shown and are favourable.

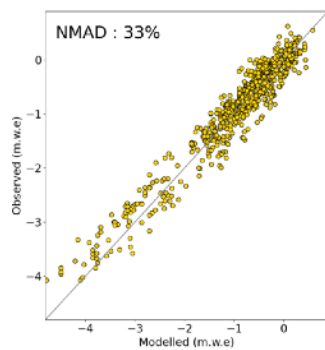
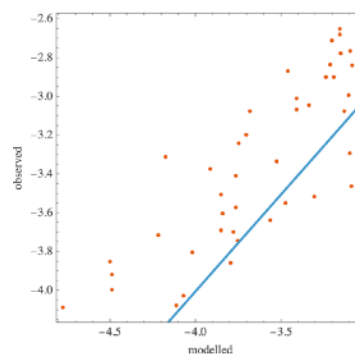


Fig 4



Bias ~-0.27, MAD~0.34

Suggestions:

1. Referring to Fig4: Could you add a plot the distribution of the glacier-specific mean biases and MADs for all the 10 glaciers in the supple, and discuss the outliers or regional pattern, if any?
 2. Referring to Fig5: Could you plot of the mean bias and MAD, binned by observed mass balance values?
 3. The point is that to understand the model performance just relying on two scalar metrics may not be enough. For examples, what if your MAD and bias are changing systematically with things like mean mass balance, glacier size, location etc.? It is good to look for and flag such instances, than relying on only two numbers and visual inspection by the readers.
 4. To illustrate the above point, while you claim 'no systematic skew' in Fig5, probably only by a visual inspection, I calculate mean bias and MAD for the window shown in the plot above to get a mean bias of ~-0.27 m/y. Can it bias your results in the extreme years?
 5. Please provide the value of bias along with MAD in the text.
 6. If you analyse model performance as suggested here, and find any systematic pattern, then the implications needs to be considered.
- o More discussion on patterns seen in fig10, including a potentially low correlation between the anomalies of summer MB and T for the positive-mass-balance years.