

Interactive comment on “Exploring uncertainty in glacier mass balance modelling with Monte Carlo simulation” by H. Machguth et al.

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This paper addresses a very important topic in glacier mass balance modeling: when modeling glacier mass/energy balance, assumptions about many parameters have to be made, especially when they have to be distributed in space. The errors that can occur with such assumptions are often not quantified and Machguth and co-authors make a valuable contribution to the scientific community by quantifying the possible errors and their influence on the mass balance. Below are a few comments on the error estimation, which need some more discussion by the authors.

- L10, P457: You introduce a measurement error of 0.3°C for you air temperature, as well for the systematic error. Since your station is on top of the roof of a

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- house, which is outside the glacier boundary layer, the systematic error is much larger, because you overestimate the air temperature for the glacier conditions by probably a few degrees. Why did you chose only such a small systematic error?
- Section 4.2.3. It would be interesting to see what the errors would be in the model run without tuning the precipitation. If you have models runs without the tuning, you could maybe mention the differences between the 'untuned' model and the measurements. You could also estimate, how large the influence of the precipitation and winter accumulation actually is.
 - Section 4.2.6.: Why didn't you compare the temperature from the Meteoschweiz with the temperatures from the AWS on the glacier to estimate the lapse rate deviations when you actually use the glacier AWS?
 - L27, P460: Your approach of introducing random uncertainties in the vertical precipitation gradients is very nice. With this, you can also account for some of the precipitation distribution that is caused by wind and does not necessary have anything to do with altitude. You can emphasize this process and the importance of the random error that you introduced in the precipitation gradient, so you have an explanation for your error.
 - Is there a reason why you did not introduce an error for wind speed. Wind speed can largely vary in complex topography, and in most models it is assumed to be uniform over the entire domain. I think, it would be interesting to quantify the influence of wind speed on the ablation.

Interactive comment on The Cryosphere Discuss., 2, 447, 2008.

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