

Reviewer#5, T. Nuimura

General comments

In this paper, authors presents to evaluate mass balance in extent area over the PKH region. The DEM differentiation method used in this study is well established robust method. Therefore this is valuable and important result as validation against recent extensive mass balance evaluation by advanced/developed procedure (e.g. Jacob et al., 2012; Kääb et al., 2012). Appropriate pre-processings, developed by previous studies including authors themselves, are comprehensively well performed before DEM differentiation. The evaluated heterogeneous mass balance are basically consistent with previous studies. I also fully agree with comments by other reviewers. Therefore, I consider this paper has quality for publishing after revision about comments from reviewers.

I am also interested in off-glacier elevation change same with anonymous referee 2, Gardner, and Bolch. Showing off-glacier elevation change is helpful for reader to evaluate quality of calculation.

They are now shown in the supplement and a histogram showing the distribution of the elevation difference off glaciers is shown on each map of elevation changes (Fig. 2-10).

Specific comments

P980/L6–7 : How do you extrapolate the result to extent area? Did you consider altitudinal distribution and geographical proximity? Further explained in Section 3.4.

We did not consider altitudinal distribution, but only assumed that the mass balance of the whole sub-region equals the mass balance of the study site. This strategy is confirmed by an analysis of ICESat data from Kääb et al., 2012 and, new, is included in the uncertainties for the overall PKH mass budget (see General response 0.4).

P984/L1–3 : Could you show standard deviation of digitized ELA in Table 2? *Ok, done.*

P986/L17–19 : Is the screening threshold for unexpected elevation change from average or median?

The selection of the threshold for discarding spurious elevation changes is neither based on average nor median but results from a visual inspection of the elevation change map for each study site (80 m for site without surging glacier, +/- 150 m for sites with surging glaciers). This is now explained in section 3.4.

P987/L9–11 : Isn't there surge type glacier with small truncated part.

We are not sure we understood the point made by T. Nuimura. The maps of elevation changes include all glaciers, even the truncated ones (Fig. 2-10). However, the latter are excluded from mass balance calculation, except for Fedtchenko and Siachen glaciers, which are not known to be surge-type glaciers.

P987/L27–29 : Including explanation about that why you did not use all three adjacent study sites to average calculation might be helpful for reader.

The need to extrapolate the mass balance from neighboring study regions to estimate the one for the Hindu Kush was a clear weakness of the submitted paper. In the revised

MS, we now compute the mass balance of the Hindu Kush by differencing a SPOT5-HRG DEM from 2008 with the SRTM DEM and obtain a value of -0.12 ± 0.16 m w.e. yr^{-1} during 1999-2008 (see more details in the revised MS).

P990/L1-4 : Did you calculate the 15% by simply averaging all error between user-defined and RGI glacier area in Table 1? As Cogley pointed out, RGI in Hengduan Shan needs further investigation. It could be omit for calculating average. And I also agree with Gardner that area-weighted average should be used.

We agree that an area weighted average would be more appropriate. Since the accuracy of the RGI is variable, we chose to assign different uncertainties depending on the sub-region. We also fully agree that errors in the RGI need to be further investigated in Hengduan Shan (among other regions).

P991/L8 : Can you show the standard deviation of elevation change in each altitude bin as error bar in Fig.4?

For the sake of clarity, the standard deviations of the elevation differences are not shown but the legend was modified to indicate that they are on average of ± 7 m.

P995/L21-23 : Showing numbers are helpful for reader.

This comment was not 100% clear. Numbers are shown in Table 5. We hope this is sufficient?

P999/L8-22 : I agree with anonymous referee #2's comment that it is only loosely related and could be removed. Especially, the suggestion about that "supraglacial lakes are not appropriate indicators" is arisen suddenly here.

Agreed and so the paragraph was removed.

Stylistic comments

P995/L2,P996/L5 : Table A2 does not exist.

Sorry for the mistake. It was in fact Table A1. Now changed to Table 5 (included in the MS and not as an appendix).