The Cryosphere Discuss., 7, C642–C644, 2013
www.the-cryosphere-discuss.net/7/C642/2013/

The Cryosphere
Discussions
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Interactive comment on "Global glacier retreat: a revised assessment of committed mass losses and sampling uncertainties" *by* S. H. Mernild et al.

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Received and published: 23 May 2013

Mernild et al (2013) provide a utilitarian approach to assessing global alpine glacier mass balance. The WGMS has generated plots of AAR versus mass balance for many glaciers in the Glacier Mass Balance Bulletin series that indicates the utility of AAR for mass balance assessment. Currently the ubiquity of satellite imagery will allow for AAR determination on most glaciers. The advantage of AAR over ELA is that the ELA is hard to assess on many smaller alpine glaciers and is a less universal number. The AAR method also allows assessment for individual glaciers that GRACE does not. ICESat will likely not be as useful for annual mass balance assessment when it comes online. The title uses the word Global glacier retreat, but retreat is not the key parameter, mass balance or volume is and key input is AAR, both mass balance and AAR should be it

title. The comments below are mainly minor, generally asking for more details that will better support the methods and results.

Specific Comments:

1990-1: This statement is true, except for glaciers with a frequent AAR of 0, indicating no accumulation zone and no point at which retreat can yield equilibrium (Pelto, 2010). The number of disappearing glaciers is significant and this response for glaciers without a consistent AAR above 0 must be briefly acknowledged.

1991-6: What is the breakdown of linear relationship, for example 20% from 0.1 to 0.3 etc.

1991-14: Reword- "indicating that the observed GIC are further from balance than previously.

1993-25: I do not understand how the second item is a bias. GRACE is just a separate measurement platform that experiences its own issues. This has been noted in the Himalaya but also by Gardner et al (2013). For the Himalaya GRACE has yielded three different values in the last three years -47 Gigatons/a (Matsuo and Heki, 2010), -4 Gigatons/a (Jacobs et al, 2012), -26 Gigatons/a (Gardner et al, 2013).

1993-25: At some point you should also contrast your results to the just published Gardner et al (2013) paper, Table 1 in their paper particular has some useful comparative material. The Gardner et al (2013) assessment should also be added to your Figure 4.

1996-16: This point deserves more attention. For example the NIWA end of summer snowline survey identifies the snowline elevation on 50 glaciers, these observations can then be used to derive AAR for all the glaciers. Also the daily availability of so many satellite imagery sources allows for identification of AAR on most glaciers annually, this can yield such a glacier specific rich database. The use of transient snowlines observations to help identify ELA and hence AAR is also worth a brief mention.

Figure 5: Better illustrate the firn, bare ice and retained snowpack.

Figure 6: Does not exist yet. It would be useful to provide a good example of a larger glacier too just like in Figure 5, such as Lemon Creek Glacier, AK or Wolverine Glacier, AK, side by side with satellite image of AAR on the same glacier.

Supplement-data file: Why does the data table contain glaciers that are not used, why not remove these?

Gardner, A.S.et al. A Reconciled Estimate of Glacier Contributions to Sea Level Rise 2003 to 2009. Science 340, 852; DOI: 10.1126/science.1234532, 2013.

Jacob, T., Wahr, J., Pfeffer, W. T., and Swenson, S.: Recent contributions of glaciers and icecaps to sea level rise, Nature, 482, 514–518, 2012.

Matsuo, K. and K. Heki, Time-variable ice loss in Asian high mountains from satellite gravimetry, Earth Planet. Sci. Lett. 290, 30-36, doi:10.1016/j.epsl.2009.11.053, 2010.

Pelto, M.: Forecasting temperate alpine glacier survival from accumulation zone observations. The Cryosphere, 4, 67–75, 2010.

Interactive comment on The Cryosphere Discuss., 7, 1987, 2013.