Reviewer#1, Graham Cogley

General Comments

This paper presents geodetic measurements of glacier mass balance for eight SPOT5 scenes spanning from the northern Pamir to southeastern Tibet and dating from 2008–2011, the measurements being derived by subtraction of SPOT5 elevations from those of the Shuttle Radar Topography Mission in 2000. The measurements build on the highly successful and reliable earlier work of the authors in other parts of south Asia. They confirm earlier patterns of spatial heterogeneity, and extend the region in which mass balance is zero or slightly positive northwards as far as the northern Pamir. In general the mass-balance rates for 2000–2011 rates are rather moderate, and when extrapolated from the SPOT5 scenes to the region as a whole are only slightly negative. Ancillary findings include further confirmation that debris-covered glacier tongues are not thinning at unusually low rates (although the measured rates are quite variable from scene to scene); new calculations of the contribution of glacier imbalance to the discharge of the major rivers draining the Himalaya and Karakoram; and new details about the prevalence of surging among glaciers of the Pamir and Karakoram, which is illustrated quite strikingly in the authors' detailed maps of glacier thinning and thickening rates.
I am surprised at how few substantive comments I ended up with, and at how minor they are. This is a valuable and highly competent study that should be published rapidly.

Substantive Comments

P979 (General)
It might be helpful to draw attention to the anomalously negative balances reported (to WGMS) for Hamtah Glacier. I have been unable to find any description of how those measurements were made, and they affect regional estimates noticeably.

> The introduction has now been considerably rewritten and the comparison to existing glaciological record reduced. A detail discussion of caveats of the Hamtah Glacier record has been recently published (Vincent et al., 2013) and the present PKH paper is probably not the right place to repeat those statements. A copy of the relevant paragraph in Vincent et al. (2013) is provided below.

> The paucity of MB observations available to compute the HK MB averages gives a large weight to individual MB measurements, some of them being questionable. Indeed, due to a difficult access to the accumulation areas, it seems that some glaciers are probably surveyed only in their lower part (which is not always clearly mentioned in sources), making the glacier-wide MB biased negatively. This may be the case of the Hamtah Glacier, for which the MBs are strongly negative (Fig. 7). The field MBs are not consistent with our space-borne measurements. For this glacier, we measured a geodetic MB of -0.45 ± 0.16 m w.e. yr^{-1} during 1999–2011 (Fig. 5), whereas the glaciological MB was -1.46 m w.e. yr^{-1} during 2000–2009 (Table 1). Consequently, some of the ground-based observational data and thus the HK MB averages, are probably biased toward negative MB.

P982

L5-6 There are very small glaciers (especially in the Hindu Kush) with up to 100% debris cover, but they are on the way to becoming rock glaciers. Perhaps there is no need to mention them.

Thanks for the information. However, we did not mention those glaciers in the revised text as the scope of our paper is not to enter into this level of details. We only focused into individual glacier mass balance for the Everest site (for the sake of comparison with earlier work) and for a few selected, generally large, emblematic glaciers.

P984

L22 What is the "along-track angle"? The azimuth, as in "the azimuth of each SPOT5 ground track"?

We used the more precise terminology suggested.

P987

L6-11 It was worthwhile to include these two very large glaciers.

L15 The density of 850±60 kg m–3 was introduceed by Sapiano, J.J., W.D. Harrison and K.A. Echelmeyer, 1998, Elevation, volume and terminus changes of nine glaciers in North America, *Journal of Glaciology*, **44**(146), 119-135.

Sapiano et al. is now cited together with Huss (2013)

P989

L9-11 These decorrelation distances can presumably be thought of as typical valley half-widths. Were they different enough between the scenes for it to be worth tabulating them.?

They are quite similar from one site to another so we do not think it is necessary to tabulate them. See table below where they are given in pixels (one DEM pixel being 40 m).

	Pamir	Karakoram	Spiti Lahaul	West Nepal	Everest	Bhutan	Hengduan shan
d (pixels)	11	11	13	15	11	10	14

L18-21 Avoid repetition; say just "Given the slender observational support for the seasonality correction (section 3.3 (v)), we assume its uncertainty to be ±100%.".

Text revised

L24-26 Repeats material at P987 L14-16. The two should be merged, in one place or the other.

Done

P994

L19ff. "of thick debris". The findings discussed in this section add to a growing body of evidence that debris cover does not retard ablation as much as might be expected. However the discussion does not mention, as it could, the possibility that one reason might be that much of the debris is thin (or discontinuous at a scale finer than that of a sensor pixel).

The text has been modified to include this possibility and a reference to Zhang et al. (in discussion, http://www.the-cryosphere-discuss.net/7/2413/2013/tcd-7-2413-2013-discussion.html) has been added as this new study nicely confirms the proposition of G. Cogley.

P997

L6-7 This sentence is weak and could be deleted, especially since the periods compared differ by only by two years out of 10–12.

Agreed

L16-21 Say more clearly why the standard error of 0.08 at L16 has become 0.14 by L21, and explain the "100%" (0.14 is not twice 0.08).

In the revised paper, the mass balance of the Hindu Kush study site is now calculated with the same method as the other study sites (see the revised "Data and methods" section). This paragraph has been deleted.

P1011

Table 1 Although this is not the place to discuss it, the RGI overestimate of 88% for the glacierized area of the Hengduan Shan scene is remarkable and deserves further investigation. RGI version 2.0 is basically the (first) Chinese Glacier Inventory (1970s–1980s) in this location.

The paragraph describing Table 1 has been improved to reflect the comment by the referee, to indicate the source of the RGI in China and to also highlight the accuracy of the RGI elsewhere.

"We note the remarkable accuracy of the RGI for all our study sites. The relative errors are generally of a few percents and up to 12% for West Nepal. The differences between our and existing inventories are probably due to the difficulty of delimitating debris-covered glacier parts (Frey et al., 2012, Paul et al., 2013) and accumulation areas. The Hengduan Shan study site is an exception. There, the RGI is based on the Chinese Glacier Inventory (Shi et al., 2009, Arendt et al., 2012) and overestimates the ice-covered area by 88% compared to our Landsat-based inventory."

Stylistic Comments

Stylistic improvements suggested have all been included in the MS. We greatly acknowledge G. Cogley for making all those useful corrections. As non native English writers, we appreciated the time he took to clarify our language.