

Interactive comment on “Recent acceleration of ice loss in the Northern Patagonia Icefield based on an updated decennial evolution” by P. López and G. Casassa

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This is an interesting study that confirms (partly...) and updates some earlier volume change assessments for this icefield. Below, I only provide some short technical comments (not a comprehensive review) and point to 2 very recent publications (Gardelle et al., in press; Willis et al., 2012) that you could not have in hand when processing these data. Their results need to be taken into account in the revised paper. In particular, I expect that the rate of elevation changes will change significantly (in particular at high elevations) once the new DEM vertical adjustment presented by (Gardelle and others, 2012, in press), building upon Paul, 2008, will be taken into account. Gardelle

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et al.'s paper shows that the off-glacier elevation bias cannot be used readily to correct DEMs on glaciated areas (see below).

Note that my Short Comment was written before the review by C. Nuth so that our comments may overlap.

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Abstract is too long (200 words is a good, JOG-inspired, target)

P3325 NPI & SPI are inversed for total areas

SRTM penetration. To back up your hypothesis of no penetration. It is not in the NPI but (Stuefer and others, 2007) suggested limited penetration of SRTM according to field data on Perito Moreno, SPI, probably due to the timing of the acquisition right in the southern hemisphere melt season, in opposite to the Northern hemisphere. Perito Moreno is a single glacier on SPI and Stuefer et al.'s result does not demonstrate that there is no penetration at all elsewhere on SPI and NPI but it is a useful info for your discussion.

SPIRIT acronym "Spot5 stereoscopic survey of Polar Ice: Reference Images & Topographies"

SPOT = Satellite Pour l'Observation de la Terre (and not Système Probatoire... which was the name of SPOT "concept" before the lunch of the first SPOT satellite in 1986)

3.2.1 section should be numbered 3.2

Bias with elevation. I invite you to read the recently accepted correspondence by (Gardelle and others, 2012, in press) available here: http://etienne.berthier.free.fr/download/Gardelle_et_al_JOG_2012.pdf . Building upon Paul (2008), Gardelle et al. shows that a bias with altitude measured on the ice-free terrain cannot be applied to the glaciated terrain and proposes a correction of such biases based on the maximum curvature of the terrain.

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Most of page 3334 is method

Your results need to be discussed in light of the paper by (Willis and others, 2012). It was published very recently which is why you could not take into account.

Table 1 11150 -> 1150

Seasonal biases. 5 year is relatively short for a geodetic measurement so that the rate of elevation changes can be sensitive to seasonal effect. You compared SRTM DEM from mid-February 2000 and SPOT5 DEM from May 2005. In May, some snowfall may already have occurred (the imagery will tell you qualitatively if this is the case or not) and may “hide” part of the thinning. To be discussed (because probably hard to correct).

Table 8 shows at the single glacier basin level strong discrepancies between the 1975-2000 thinning rates from Rignot et al., 2003 and from this paper. To be commented in more details. In particular, the following statement (P3336) does not seem to reasonable hold. “As shown in Table 8 no significant differences exist between the results obtained by Rignot et al. (2003), Rivera et al. (2007) and the results obtained in this study. This comparison allows validating our results.”

Fig 2. Clarify what the white regions are (above a max altitude? If this is so then change the color scale). In this figure, you should mask out the unreliable elevation in the DEMs (based on the correlation mask for SPOT5 and the non gap-filled version of the SRTM DEM) so that the readers can really see where reliable data exist.

Good luck with the revision of the paper.

Gardelle, J., E. Berthier and Y. Arnaud. 2012, in press. Impact of resolution and radar penetration on glacier elevation changes computed from multi-temporal DEMs. Journal of Glaciology.

Stuefer, M., H. Rott and P. Skvarca. 2007. Glaciar Perito Moreno, Patagonia: climate sensitivities and glacier characteristics preceding the 2003/04 and 2005/06 damming

C1757

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events. Journal of Glaciology, 53(180), 3-16.

Willis, M.J., A.K. Melkonian, M.E. Pritchard and J.A. Ramage. 2012. Ice loss rates at the Northern Patagonian Icefield derived using a decade of satellite remote sensing. Remote Sensing of Environment, 117, 184-198.

Interactive comment on The Cryosphere Discuss., 5, 3323, 2011.

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