Our anwers to the points raised by M. Pelto in ***italic**:*

Ablation zone validation: Compare the results of this model for ablation to the basic well used degree day models for which there is local validation of the coefficients. For example, Stuefer et al (2007) noted mean degree-day factors during summer periods amount to 0.61-0.64 cm w.e. C-1 d-1for ice ablation. These values are comparable to those of other glaciers in maritime regions (Hock, 2003). For snow they indicate typical maritime values of between 0.27 and 0.43 cm w.e. C-1 d-1. De Angelis (2013) modeled ablation using a degree-day factor of 0.65 cm w.e. C-1 d-1 for ice, and 0. 35 cm w.e. C-1 d-1.

We will compare our model result with the results of Stuefer et al (2007) and De Angelis (2014) in a mass balance profile plot. Generating degree day factors and comparing them to values found in literature, we think is not a very powerful quality assessment tool for our model's results.

Precipitation trend verification: The authors identify a recent increase in precipitation that I cannot discern from their data. Aravena and Luckman (2009) identified the dominant spatial and temporal patterns of a network of 23 homogenous instrumental rainfall records of Southern South America but do not identify this increase. The same group of authors in reporting on NPI Figure 5 and 6 do not display this trend in precipitation (Schaefer et al, 2013). Garreaud et al (2013) examine Patagonia climate in detail and derive maximum precipitation of 9000 mm. They also identify no trend, though data ends in 2001. I am not arguing that the trend does not exist or that the modelled results for precipitation are not correct. However, without better comparison and verification the cited increase in precipitation is not demonstrated. The 8.36 m of average accumulated precipitation could also be compared to other model results such as Garreaud et al (2013).

The problem of a comparison with the two cited studies is the different time span. The significant trend in average accumulation in our data of 0.043±0.009 m/year in 1975-2011 for example changes to 0.033±0.028 m/year for 1975-2000 which is not significant any more at the 5% level. Many of the stations with longer records of Table 2 in Schaefer et al (2013) show increasing trends (Coyhayque,Puerto Aysen, Bahía Murta), which however are not significant at the 5% level. Puerto Chacabuco, being less than 20 km away from Puerto Aysen, shows a negative trend. Figure 4 in the same paper shows that precipitation trends can spatially vary very much in this region. Garreaud et al (2013) do not compute the average annual precipitation over SPI.

ELA-Balance Gradient verification: The paper does not present a balance gradient which is the standard graph for surface mass balance reporting by the WGMS. Since, there are lots of directly measured balance gradients, the range of possible gradients is well constrained. DeAnglis (2013) Figure 1 provides a range of balance gradients. Is the derived balance gradient from the model used here appropriate?

Mass balance profile plots will be provided for Perito Moreno Glacier and compared to mb-profiles in literature.

The ELA is a key measure of mass balance and WGMS plots the relationship between ELA and annual balance for each reporting glacier. The ELA can be approximately observed using satellite imagery and hence can be used for verification. ELA is not mentioned in this paper. For a given year is the ELA correctly modelled? Barcaza et al (2009) use satellite imagery to report annual ELA for many years during the 1979-2003 period on NPI glaciers. Willis et al (2012) and Schaefer et al (2013) do use ELA observations for comparison on NPI, so maybe it was done for SPI as well. Table 6 in the latter mentioned paper provides just the comparison that would be ideal. DeAnglis (2013) identified the snowline for SPI glaciers using cloud free MODIS images. For the NPI Schaefer et al (2013) note that nearly all ELA's obtained from the simulation are higher than the observed snowline altitudes at the end of the ablation season. This is the type of comparison that is important.

We compare the ELA's obtained from our model to the observed snowline altitudes at the end of the ablation season by De Angelis (2014) in a new version of the paper.

Verification of overall surface mass balance: The authors assert that the mass balance loss is due to calving for SPI and the surface mass balance is somewhat positive. This implies that glaciers that are not calving should not be losing significant volume. An easy validation therefore is to compare what the mass balance of some non-calving glaciers is with the observed area and volume losses of recent studies. That noncalving glaciers have a positive mass balance does not fit with findings of Davies and Glasser (2012). Of course many of these glaciers are smaller and due not reach the highest elevations. Hence, without a specific validation by the authors this discrepancy is suggestive but not indicative of model issues. Glasser and Davies (2012) note that small annual rates of area loss increased dramatically after 2001 for mountain glaciers north of 52 S including the large icefields. For SPI they noted the fastest SPI loss since 1870 was from 2001-2011. Further for SPI though some calving outlet glaciers are shrinking rapidly in general, small, land-terminating glaciers are experiencing the highest loss. In Table 3 the land-terminating glaciers are shrinking at rates of 0.29% a–1 from 2001 to 2011, compared with 0.08% a–1 for calving glaciers. If the model does not generate negative balances for these land based glaciers that have been losing volume without calving, then the surface mass balance model must be adjusted.

Our model is producing negative surface mass balances for 182 of the 395 analysed catchments. Several of them are visible as small yellow-greenish patches in Figure 2c). However care has to be taken with the non-calving glacier classification, since formerly non-calving glaciers of the SPI have developed pro-glacial lakes now, similarly as it was documented for the NPI (Loriaux 2013). For example the three glaciers that were classified as non-calving in Rignot et al(2003), (Bravo,Frias and Olvidado) have all developed pro-glacial lakes now.

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