We thank reviewer 2 for his/her suggestions and comments. Original comments are given in bold below, followed by our responses.

General comments

The GIMP data set is a fantastic resource for anyone studying the Greenland ice sheet and clearly a lot of work went into producing it. This paper is as far as I am aware the only one that describes the development and accuracy of the data and is therefore a useful contribution. However, what was missing was any real interpretation of the data sets and this is reflected in the conclusions section which is not a conclusion at all but a description of how to access the data and the next phase of the project. I understand that this is a paper describing the generation of a data set but it would not have been a lot more work to have included some analysis of the data set that indicates the value of the improved resolution and accuracy. Has the area of the ice sheet changed from previous estimates (will come back to this below), for example?

There actually is no other complete mapping of the ice sheet from a different epoch with a resolution allowable for such change detection. The Raster et al. 2012 mapping is for only peripheral glaciers as icecaps (and actually uses the GIMP mask for the northern regions). There are studies that look at changes for small sections of margin, but this is out of the scope of this paper. As described in the introduction, one of the purposes of this datasets is to provide a benchmark for future studies.

Do drainage basin boundaries change with the new data or is it easier to identify them (compared to say Rignot and Kagnaratham 2006)?

As explained in the paper, the interior ice sheet (above the equilibrium line) is the older Bamber/Photoclinometry Map (registered to ICESat) which is the same DEM used for mapping drainages. The high resolution of the GIMP DEM may improve drainage delineation at the margins and in off-ice regions, but this detail is not within the scope of this paper.

What about a difference plot between this and say the PEB DEM to show how big some of the differences are between the two etc.?

We have attempted to do this in Figure 5. A “difference plot” just looks like a lot of noise over the periphery/margin owing to the large difference in resolutions between the datasets and doesn’t provide more information.

With a little more effort, the value of the data set would be much more apparent and would sell itself much more than it does now. There is little that is controversial in this paper and the methods are well described. I just feel more effort could have been made in presenting and interpreting the products described.

Again, the primary objectives of this paper are to describe the datasets and their limitations and errors. There have been several, already published studies already that have used these products with more in review.

Specific comments

P3, l8. Excessive use of jargon/acronyms. What is ESPG. Why not just spell it out. You only use it twice. Ditto P4 l5: LTK?

We have eliminated these acronyms from the text.

There are other cases where the acronym is not needed and would make it easier to follow if it was not used. Section 5.6 is particularly acronym heavy.

Section 5.6 is acronym heavy because it describes merging of several data sets described in previous sections. We do not see an obvious way of reducing these without losing required detail.

Section 4: masks. Nowhere do you state what you define as glacier ice and whether you have separate classifications as per Rastner et al for example. need to make this clear.

We have added the following text to section 4:
"Similarly, glaciers were differentiated from perennial snowfields by visible crevassing, surface moraines, and the existence of toe. Snowfields without these features were not classified as glacier."
It's not clear what is meant by "separate classification means". Rastner et al 2012 divides the classification based on connectedness with the ice sheet.

Section 5.2 PEB DEM. The PEB DEM is derived from elevation data collected around 1995. ICESat data is from 03-09 so there is a >10 year gap between the two. Some, possibly significant, component of the RMS difference (not error) will be due to the elevation change between the dates of acquisition. Is it not possible to exclude areas of large elevation change from the analysis (e.g. anywhere where the velocity is >100 m/yr or where ICESat measures rates greater than some value say). This would be a more useful and informative measure of the RMS difference. One can only talk about RMSE if what is being compared to has no error or is considered to be a stationary reference. This is not the case here, but you could possibly make this case if you removed all the areas with large elevation rates.

First, we reiterate in the text that the reported RMS statistics are between ICESat and *co-registered* PEB DEM - so that that the PEB DEM is fit to the ICESat point cloud, removing

the time-dependent offset. These RMS statics are then the residuals of the model that fits the data. This demonstrated by the fact that regions with high PEB errors are found in areas with little/no elevation change, such as the East and Northeas (see table 1).
Second, a problem with removing areas of high surface elevation change from the statistics is that these are also marginal areas with higher slopes, and thus tend to have the higher errors in the PEB DEM. Indeed, removing areas of speeds > 100 m/a would remove nearly the entire portion new high-resolution data provided by the GIMP DEM.

P9 l20-25. There is a contradiction here. l20 refers to the ice sheet RMS but later you discuss ice-free terrain as inflating the error. If it is the ice sheet RMS then surely the ice free terrain has been excluded from the estimate?

This referred to the total Greenland (Land & ice) RMS, not just the ice sheet, and had been edited.

P14, l2 which less -> which is less

corrected

P14, l25 cause in DEM -> cause DEM

corrected

Section 6. This is not a conclusion. It is a description of how to get the data and what you plan to do next. This does not sell this wonderful product well and does all the hard work that went into producing it something of a disservice.

We have reorganized the conclusion section and added a sentence summarizing the objective of the paper.

P26, Fig 7. Need to annotate figure with arrows showing artefacts. They are not obvious to a non expert.

The column artifacts are widespread in this example, so arrows or other markers would make it cluttered. Instead, we provide a detailed description of the artifacts in the caption, which should make their location in the figure obvious to anyone slightly acquainted with glaciers.