

Interactive comment on “A new 1 km digital elevation model of Antarctica derived from combined radar and laser data – Part 2: Validation and error estimates” by J. A. Griggs and J. L. Bamber

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We would like to thank referee 1 for their insightful review of our manuscript. We are in agreement with most points made by the referee and have altered the manuscript accordingly. We believe that these changes have made considerably improvement to the manuscript.

We respond to each point in turn.

General comments

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- 1) Emphasising need for error map. We have added some additional emphasis into the introduction section and into the discussion of the error map.
- 2) Figure quality. We have changed all the figures to make the text (particularly the histograms) clearer and have made the background images of the DEM lighter so that the validation data is more easily seen.
- 3) Discussion. We have changed the section previously called discussion to ‘Comparison to other available DEMs’ because, as the referee states, that is all the section contains. We have also added some discussion to the end of error map section about the influence of the errors on likely products and we have included a much more substantial discussion of the DEM and its influence on possible products in part 1.
- 4) Conclusions. We have edited the conclusions so that they are less understated.

Specific comments

- 1) Interpolation. We have included text to discuss the interpolation used in the validation.
- 2) Baselines. We were unclear in the text. As expected, the longer baseline between the aircraft and the GPS basestation in Antarctica than Greenland results in higher uncertainty. We have clarified the sentence.
- 3) Figure 2. This was the result of some airborne data which was ocean viewing entering our comparisons. These data have been removed from the comparison and the histogram is now spike-free as expected. The histogram still shows significant spread but this is as we expect in the Peninsula where we have little data entering the DEM and large uncertainty in the results.
- 4) RMS. We have defined RMS at its first use and also added a short section at the beginning of the validation to discuss all the statistics used and why.
- 5) Dates of campaign. We agree and have added the timestamp of the DEM to this

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manuscript.

6) Crevasses. Missing small scale undulations on the surface will produce positive and negative differences whereas crevasses will only produce a difference in one direction. We have clarified the text to reflect this.

7) Good. We have changed 'good' to more meaningful terms at all uses.

8) Aerial coverage. We have added such a column to table 1.

Technical Corrections

1) RMS has been spelt out.

2) 'Dots' has been replaced.

3) Figure 1 has been changed to make it clearer and the text more easily readable.

4) Figures 3, 4 and 7. We have changed all the histograms.

5) Figures 2 and 3. We have lightened the background image of the DEM so that the data are much easier to see.

6) Figure 4. We have explained the box in the caption.

7) Figure 6. The background is also a shaded relief plot. The reason it looks slightly different is that it is a smaller area which is being zoomed into than other figures and is also an area with a very smooth surface. This is why we display this region in particular as it one of the areas of high slope and low roughness which is particularly affected by the choice of bias correction in the ERS data.

8) Tables. We have added a definition and discussion of the meaning of FWHM at the start of the validation.

9) P851L3. Changed as suggested.

10) Figure/Fig. We have changed to figure throughout.

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11) Lat-long figures. We have displayed the figures on an x-y grid as this is the polar stereographic grid that the DEM and error maps are created on and on which they will be distributed. Lat-long axes would cause distortion in the figures particularly the SOAR/CASERTZ comparison as it contains a wide range of latitude. We have however, changed the axis labels to kilometres from the pole rather than the corner of the figure which will enable the reader to easily reference them back to the distributed DEM and error map grids.

12) Figure 9. We have increased the text size.

13) Figure 10. We have included the lines of latitude and tickmarks showing longitude as suggested.

Interactive comment on The Cryosphere Discuss., 2, 843, 2008.

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