

Preliminary response to Anonymous Referee #2

Thomas Slater, Andrew Shepherd, Malcolm McMillan, Alan Muir, Lin Gilbert, Anna E. Hogg, Hannes Konrad, Tommaso Parrinello

We would like to thank you for your constructive review of the manuscript. We will address the rest of your comments in due course – however we would like to immediately address Fig. 2 included in your review. We have tried to reproduce your figure by plotting difference maps between the ICESat DEM, the 1 km CryoSat-2 DEM presented in this paper, and other publicly available DEMs (see Fig. 1 a) to c)). However, we cannot replicate the pattern you are experiencing, and see similar difference patterns for all tested DEMs. Please could you provide more information as to how Fig. 2 was produced? Specifically, please could you cite which input ICESat dataset was used (geoid, posted resolution, etc.)? Because the Antarctic ICESat DEM is posted at a resolution of 500 m, different to the new CryoSat-2 DEM, one of the DEMs must be resampled to the other to generate the difference plot. Please could you specify which method was used so we can keep our method consistent with the one used in your review?

In addition, can we please ask you to confirm the source of the new CryoSat-2 DEM, attributed to us, used in Fig. 1 and Fig. 2 of your review? Earlier this year we made a preliminary version of the CryoSat-2 DEM available for download to the community, which is posted at a coarser resolution of 2 km and not generated with the same blended approach as described in our manuscript. As such it is a separate product from the new 1 km CryoSat-2 DEM reported in this paper. The new 1 km CryoSat-2 DEM has not yet been publicly released, but we will of course make the new dataset freely available to the scientific community in the future alongside this detailed methods paper.

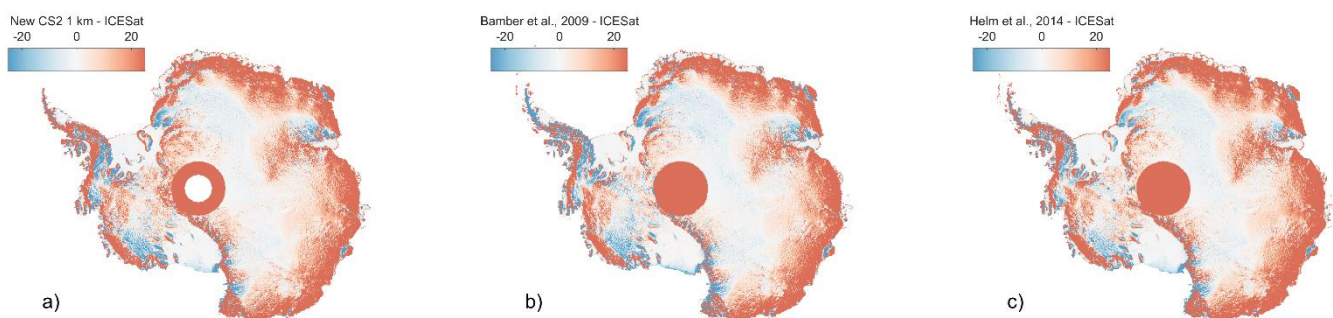


Figure 1: Difference between resampled ICESat DEM (WGS84 version) (DiMarzio et al., 2009) and a) new CryoSat-2 DEM presented in the submitted manuscript, b) Bamber et al. (2009) DEM (Bamber et al., 2009), and c) Helm et al. (2014) CryoSat-2 DEM (Helm et al., 2014)

References

Bamber, J. L., Gomez-Dans, and J. L., Griggs, J. A.: A new digital elevation model of the Antarctic derived from combined satellite radar and laser data – Part 1: Data and methods, *The Cryosphere*, 3, 101-111, doi:10.5194/tc-3-101-2009, 2009.

DiMarzio, J., Brenner, A., Schutz, R., Shuman, C. A., and Zwally, H. J.: GLAS/ICESat 500m laser altimetry digital elevation model of Antarctica, Boulder, Colorado, USA. National Snow and Ice Data Center, Digital Media, 2007.

Helm, V., Humbert, A., and Miller, H.: Elevation and elevation change of Greenland and Antarctica derived from CryoSat-2, *The Cryosphere*, 8, 1539-1559, doi:10.5194/tc-8-1539-2014, 2014.