

## ***Interactive comment on “A new Digital Elevation Model of Antarctica derived from CryoSat-2 altimetry” by Thomas Slater et al.***

**Anonymous Referee #1**

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This is a generally well written and sound paper that describes the construction of a new Cryosat2 DEM and tests its accuracy. The paper shows that the new DEM exceeds the accuracy of other elevation models for the ice sheets and therefore it will be very useful to the Antarctic and Cryosphere community as a whole. Apart from a few small points I would suggest that the manuscript is good I list those minor points below: 1. Page 1 Line 24: “surface elevation is essential for delineation of drainage basins” – this is not totally true – although early work on drainage basins (early Rignot and Zwally papers), used surface slope to delineate drainage, later Rignot papers used flow and flow direction which is a more robust method. I would temper the sentence by saying “can be used” rather than are essential. 2. Page 2 line 5: It might be worth adding that over rock outcrops and steeper slopes, where cryostat coverage is

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poorer, the photogrammetric models do perform better and so act as an alternative in these regions. 3. Page 3 line 30. Reading the text I was a little unsure if the figures (percentages) included the polar hole or not. Please clarify. 4. Page 4 line 10: Why use Kriging? There are lots of alternative interpolation methods, all will give slightly different results, but you do not say why this method was chosen rather than the others. Do you have any evidence that this is the best method to use? 5. A slight grammatical point on page 7 and through the text; the phrase “At the Antarctic Peninsula” and “At the Antarctic Ice shelves” should be changed to “On the .....”. 6. Page 9 line 22+23: are there also more data gaps in the high slope areas that add to the inaccuracies over these regions? If so it would be worth adding the point. 7. Figure 1 and figure 8: please remove the lines connecting the points as these are misrepresentative. Both these figures would be better as histograms rather than line graphs. 8. In the figure legend for figure 2 I would add a point explaining the noticeable blue line where the mode changes from LRM and SARIn modes.

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2017-223>, 2017.

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