

Comments to the Author:

Dear authors,

Your paper has now been assessed again by one of the original referees, and I am happy to inform you that your manuscript is acceptable for publication once you have satisfactorily implemented the last few edits suggested by the referee (see below). These final edits will be assessed by me, before final publication.

Best,
Louise

referee comments:

I am pleased to see the much more convincing results in Sect.3 and acknowledge the additional work the authors have put into this analysis and several other parts of the manuscript. I have only a few remaining minor comments on the revised version.

One main point is that there are several places where the reader is referred to McMillan et al., 2019. This is okay when referring to details about the approach (as e.g. in l.111). However, Sect.5 is impossible to interpret at all without switching between those two papers several times. I think, also a “Brief Communication” should be understandable on its own (this refers mainly to my comments on l.104 and l.117).

[Please see our individual responses to the comments below.](#)

After the following minor comments are addressed, I suggest the manuscript for publication:

l.53 Why is this region called “Spirit site”? Isn’t it Adélie Land / George V Land? How are OIB flights distributed there? You say, you want to make the validation comparable to McMillan et al., 2019, but why don’t you use the regions “Dronning Maud Land” and “Wilkes Land” then?

[Sorry, this was a poor choice of name – as highlighted by the reviewer – and we should have referred to it as ‘Wilkes Land’, as it is exactly the same area used in McMillan et al., 2019. The use of ‘Spirit’ stemmed from an informal name used in a previous project \(*Sentinel-3 Performance Improvement for Ice Sheets*\), but it is clearly more appropriate to use a more established Antarctica naming convention. We have therefore updated the text to address this oversight. Further details relating to the site can be found in McMillan et al., 2019.](#)

Fig. 1a) I suggest to use a more gradual color scale like “Viridis” or “Plasma”. Furthermore, it is difficult to decide if black color is the shade of the relief or means $R \leq 0.7$ (both would be expected in rugged terrain).

[As suggested, we have adapted the colour scale to remove black and therefore avoid any confusion with the underlying greyscale shaded relief. Regarding the initial point, we have spent a long time trying to optimise the colour scale for clarity, including testing multiple variants of more gradual colour scales. However, we found that these were more difficult to](#)

interpret in terms of being able to match a specific colour on the plot to a particular R value. Therefore, we would strongly prefer to keep a discrete colour scale, as we believe it is clearer and more easily interpretable for the reader.

l.104 I guess that “dispersion” means MAD. Please define (also for Sect. 5).

Here we are referring to the standard deviation, as already described in the text:

‘... we computed the standard deviation of all measurements made by each satellite within 1 km intervals along the satellite track. This yielded an estimate of the dispersion...’

However, as this was not clear to the reviewer, we have reworded to try and add further clarity:

‘... we computed the standard deviation of all measurements made by each satellite within 1 km intervals along the satellite track. We used the estimated standard deviation as a measure of the precision...’

As requested, we have also added further clarification relating to this point in Section 5.

l.111 Briefly mention what “reference datasets” are (OIB/airborne profiles, refer to Sect.2).

We have added text as requested.

l.117 In order to give the reader the ability to interpret the significance by her/his own, please also mention the median bias and the MAD between S3 and the reference dataset (or at least the order of magnitude). I know that this is given in Tab.3 of McMillan et al., 2019 but mentioning at least the key results (or order of magnitude) here would make this section understandable on its own.

As requested, we have added text here to address this point.