

Interactive comment on “Unmanned Aerial System nadir reflectance and MODIS Nadir BRDF-Adjusted surface Reflectances intercompared over Greenland” by John Faulkner Burkhart et al.

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1 General Response

The reviewer provided helpful comments regarding the context and placement of the manuscript, and helped to highlight where some points were felt to be redundant. We appreciate the feedback and have taken it into consideration throughout our revision process.

C1

2 Detailed comments:

P3, L8-34: structure confused in places, e.g. on L12-13 you introduce the 210 km track at the end of a paragraph about the novelty of the technique you are using. Move to the following paragraph to given a 1-para summary of your methods. Last para on this page – very wordy, do you need link to the overall project you are part of?

We have tried to rewrite and clean the wording here. We feel mentioning the project is quite relevant as it helps place our work in the context of not only albedo variability, but also the level of accuracy we sought as we attempted to make measurements of relevance to the ‘aerosol deposition’ story.

General observation: ‘complex’ appears often, this isn’t a very precise word and so should be removed where possible.

Thank you, we’ve gone through now and adjusted our working accordingly.

P2, L19-25. You mention ground-based measurements – what is being compared to what?

In general, satellite sensor data to ground-based measurements. Further in the text, we describe for the different studies referenced what is being compared. To some degree, this is the point we attempt to make, that many ‘albedo’ validation studies are comparing the measured blue sky albedos with satellite radiances (and their associated model chains).

P8, Radiative transfer simulations: I’m unclear what these simulations are actually used for?

We hope this is further clarified now in the text. These are used primarily to address sensitivity to the haze layer (Fig.9) as well as our evaluation of the platform sensitivity to orientation (Fig. 3).

P10, L12-19 – discussion about blue-sky albedos needs to be rephrased for clarity, I’m not exactly sure what point you are making here.

C2

This is now clarified in the text.

P11, L4-11 – ‘given this consideration, the correspondence is impressive’ – not entirely sure how the consideration (presumably about MODIS but this isn’t clear) maps onto the UAS data?

We have adjusted the sentence to clarify the ‘correspondence’.

P11, L25-27 – this is essentially the figure caption, remove.

Good point. Done.

There are too many examples of bad grammar and typesetting for me to list here. I recommend proof-reading by a fluent English speaker. In terms of typesetting, the most glaring problem is that often the references appear as “statement about x Burkhart et al (2016)” when they should appear as “statement about x (Burkhart et al, 2016).

Thank you. Hard to swallow, but perhaps I’ve lived too long within a foreign language environment, that I am now losing my own! Regardless, you are correct. I found these errors now and believe we have addressed them all.

3 Figure Comments:

The figures are generally of good quality.

Thank you.

Fig 1: move away from rainbow colour palette for the different snow grain sizes, this is especially confusing on a plot with wavelength as the x axis. Suggest move to monotone colour palette.

We’ve adjusted this now. We recognize the blue,green,red scheme is not optimal for color blind individuals, but the colors reflect the colors of the MODIS bands and are not essential in this context to distinguish from one another, but rather show the general shape of the response functions.

C3

Fig 2: change colourmap of images to something meaningful, i.e. a monotone linear colour ramp. In addition rainbow colourmaps present colourblind readers with significant difficulties and for this reason alone should not be used.

We’ve addressed this now.

Figs 5 and 6: the transect direction labels are rather unclear. Can you add section dividers or equivalent to segment the different portions of the flight?

This should be more clear now. We’ve changed Figure 8 and highlighted the direction of the flight as well as adding some further descriptive information in the caption.

Figs 5 and 6: There is insufficient difference in colour between the UAV measurements for band 3 versus MODIS QA=0. Please change.

Done.

Figs 5 and 6: would suggest labelling MODIS QA as ‘good’ and ‘bad’, so the reader doesn’t have to remember what 0 and 1 are – to me they are arguably the ‘wrong’ way around!

We only follow protocols as defined by NASA for their products. We’ve tried to make this more clear.

Fig 7: the labelling here needs improvement. Label each row with exactly what it is showing (i.e. date, MODIS collection) rather than leaving it to the reader to work out from the caption.

This is corrected.

Table 1: the contents of this is essentially shown in Figure 1 and I therefore suggest that this could be dropped to save space.

We have removed Table 1 and placed the reference to the MODIS specifications in the text.

Interactive comment on The Cryosphere Discuss., doi:10.5194/tc-2016-264, 2016.

C4