

Editors report on TC-2019-263, Onuma et al.

Thank you for your thorough response to the two reviewers. I now invite you to incorporate these changes into a revised manuscript. In addition to the changes requested by the reviewers, I also request that you consider my suggestions below, which are based on my assessment of the reviews and the response.

I look forward to receiving the revised version of the manuscript.

Kind regards,

Dr Elizabeth Bagshaw

Title: I suggest shortening this amended title, perhaps to 'Physically-based model of the contribution of snow algal cells to temporal changes in albedo' or 'Physically-based modelling of algal-induced snow albedo changes' or similar. The new title is, of course, fully correct and addresses the reviewer's concerns, but I find it overly long-winded.

L46: you suggest that 'to explain clearly, the value (0.7%) has been changed to 'approximately 1%' (Line 47).' I instead suggest simply rewriting to 'was reported to be 0.7% lower than BC'.

L103: Suggest adding a qualifier to this sentence to acknowledge the reviewer's suggestion: 'They consisted mostly of the spherical red cells of *Cd. nivalis*, with mean diameter was $21.3 \pm 2.3 \mu\text{m}$ (Onuma et al., 2018), although there was no molecular analysis of all species present'.

L328-343 in revised manuscript: 'activity' should be 'actively' in 'and thus not activity increase their population.'

L351 New citation: Williamson et al. 2020. Please check your citation, since there are several typos in the author list you include in your response.

L381-385 in revised manuscript: please rephrase this final sentence: 'Moreover, the detailed spatial measurements of algal cell abundance and snow albedo would also be needed because patchy distribution of red snow often appear on oligotrophic polar and alpine snow.' – patchy snow appears on snow?

L426: 'accelerated loss in mass balance' is not strictly correct. I would rephrase to 'accelerated loss in mass' or 'decreased mass balance' or similar.

L443-446 in revised manuscript: 'In the model simulation, snow temperature becomes 0°C when the temperature exceeds 0°C by warming test.' I am unclear what a 'warming test' is, please rephrase.

Table 1: please rewrite these values in scientific notation, eg. 8×10^{-3}

Figure 2: please label the x-axis in at least the bottom figure

Figure 7: first, be consistent with 'Fig, 7' or 'Fig. 7' in the text. Second, I find the justification for the gray shading hard to understand, even with your explanation in response to the reviewer. Please can you very clearly state what the shading indicates, and how/why this differs from the coloured lines on the plot?