

Response to editor comments

Thank you for recommending our manuscript for publication and for the time you have put into editing it.

We have made the following modifications in response to your comments:

Editor comment: L104: 'Similarly for F-' is stranded. Is this an error, or if deliberate, can it be combined into a sentence?

Response: This has been replaced with 'A similar argument applies for F_-'.

Editor comment: L329: Change to 'multiple sources of such nutrients located within the modelled space' - to make clear that the 'nutrient' is rarely a single entity but likely bound to a particle.

Response: This change has been made.

Editor comment: L580: 'is more water and more microbial biomass near the surface' for grammatical correctness.

Response: This change has been made.

Editor comment: L623: 'namely C, N, P and a variety of micronutrients. Our model can be interpreted as whichever of the three macronutrients (C, N or P) is limiting. In the case of glacier ice algae and cryoconite microbial communities, P is usually the limiting nutrient (McCutcheon, 2021, Stibal 2008 10.1029/2007JG000429 and Bagshaw 2013 10.1657/1938-4246-45.4.440)'.

Response: This change has been made. Thank you for the literature suggestions.

Editor comment: Remove at least one or two 'moreovers' from the text - it is rather overused.

Response: We have removed three 'moreovers' from the text: L418, L523 and L632 (where we have replaced 'Moreover, we have found the...' with 'We have also found that the...'). Note that the line numbers refer to the marked up manuscript from the previous revision.