



EGUsphere, community comment CC1
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Comment on egusphere-2022-1086

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Community comment on "A model of the weathering crust and microbial activity on an ice-sheet surface" by Tilly Woods and Ian J. Hewitt, EGU sphere, <https://doi.org/10.5194/egusphere-2022-1086-CC1>, 2022

It is great that someone has been brave enough to produce a 1D model of the weathering crust, attempting to include the potential impact of nutrients and microbes, given the paucity of field data with which to parametrise the model, particularly for nutrients and microbes. The strength of the work is that it presents a structure into which the field data can be hung, trailed and tested. And it forces a holistic understanding of the weathering crust, which integrates physical, chemical and biological processes. This music to interdisciplinary glaciologists. The downside of being the first attempt is that the representation of field processes is necessarily simplified, as the authors highlight. Clearly, dark, light adsorbing particulates, such as ice algae and other pigmented microbes, can melt into the ice surface and are not only passively advected upwards by the ice towards the surface. Likewise, microbes in the frozen weathering crust of the previous year can utilise nutrients within the ice during the spring melt. Nutrients are not only sourced from ice, and may have atmospheric sources from dry deposition, and the C:N:P ratios of microbes may vary during the melt season because of environmental pressures. There is much devil in the more complex detail of the real world, even in the relatively simple ice-water-microbe-nutrient system of the weathering crust, and I feel that extrapolation of a simplified model into a predictive tool for a warming world is to be undertaken with great caution, and the resulting conclusions heavily caveated. That said, someone had to be brave enough to take the first step of providing a simplified model structure and the benefits to the community greatly outweigh the dangers of believing first extrapolations. This work will stimulate further integrative modelling, and this is what weathering crust science needs.