



EGUsphere, referee comment RC2  
<https://doi.org/10.5194/egusphere-2022-908-RC2>, 2022  
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## **Comment on egusphere-2022-908**

Simon Bottrell (Referee)

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Referee comment on "Abrasion of sedimentary rocks as a source of hydrogen peroxide and nutrients to subglacial ecosystems" by Beatriz Gill-Olivas et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-908-RC2>, 2022

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This study uses simplified model lab experiments to assess the potential of comminution of materials by glacial abrasion as a source of hydrogen peroxide and nutrients to the subglacial environment. This is presented in the context of "standard" models for subglacial solute acquisition. The manuscript is well organized and written and the processes and logic are clear and easy to follow. This is work that will be significant to those interested in subglacial weathering and biogeochemistry as it opens up the potential of some novel possibilities. In this respect this seems to me to be a valuable "reconnaissance" study that should inspire future work on these possibilities.

Major comments:

LL 234-239 – the r-values presented don't carry much weight without associated P-values!

L330 et seq. This discussion about the fate of radicals is a kind of "post-hoc" discussion. It relies quite heavily on the mineralogical composition of the materials tested but I don't see that data clearly presented – was there petrographic and/or XRD characterization? Or does this rely on previous studies? (and NB: these may have been made with very different objectives in mind). To my mind this needs to be clarified and reported much more explicitly here (indeed, future work might require experiments on single minerals/model mixtures to unambiguously identify mechanisms but this present work has great value in identifying that these interesting new possibilities exist in "real" materials).

Minor comments:

L60 . . . of which is . . . (NOT . . . of which, are . . .) (knowledge is singular)

L157 – I'm not sure that the word "furnace" can be used as a verb in this way.

L304. Lab air contamination is mentioned – at what stage in the process was this entrained in the sample and what background/blank analyses were made??

LL354-5 – Previous crushing experiments . . . S L Whillans . . . provide appropriate reference to the source of these data here.

LL378-380. This is the one place where the otherwise excellent organization of the text breaks down. There is a hierarchy of links here that is presented in an ambiguous and confusing way. Apparently the hydrological system of SLM is fed by the Whillans ice stream, and glaciers on Svalbard!! Need to make it clear that:

- methanogens have been found in (geographically) diverse subglacial environments (Robertson, Svalbard, SLW);
- SLW and SLM share a similar hydrological regime.

Simply putting the Svalbard example first in the current structure would help.