

Biogeosciences Discuss., author comment AC2  
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## Reply on RC1

Corinna Gall et al.

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Author comment on "Pioneer biocrust communities prevent soil erosion in temperate forests after disturbances" by Corinna Gall et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-343-AC2>, 2022

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We thank the reviewer very much for this in depth and positive evaluation of our work. Comments provide a strong basis for substantial improvements, which will be included after the review reports are complete.

Illustrations will be added as we strongly agree that adequate graphical display is most beneficial for this topic. Furthermore, naming and dating issues will be adapted as suggested. Moreover, a thorough language check will be conducted after revision of all given comments.

Lastly, we would like to thank the reviewer for the significant comment on the classification of plant communities as biocrusts. This hits a most interesting point that has been discussed intensively.

It is agreed that the moss genera mentioned in the review grow with the bulk of their biomass above the ground and do not meet the basic definition of a biocrust. At the same time, however, they make up a smaller part of the biomass at the beginning of succession. Along with many other moss species, single lichens, algae, and cyanobacteria, larger amounts of moss protonema can be observed on the soil surface immediately after disturbance. Together, they can show crustal characteristics at the beginning, which fulfill the definition of Belnap, Büdel, Lange, 2003. In this temperate forest ecosystem, however, they are found, as the reviewer is correctly assuming, only selectively and they continue to develop quickly, with the crustal characteristic disappearing more and more.

Nevertheless, this observation has been made more often, and very clearly e.g. in highly disturbed subtropical forest plantations, where larger crustal patches were still detectable after 2-3 years (Seitz et al. 2017, in this journal).

In this context, this early soil cover after timber harvest fulfills an essential (biocrust) function, namely, the protection against erosion at a moment when the soil is highly susceptible. This protective function then passes smoothly into further vegetation development and, according to our observations, is even more enhanced by fully developed mosses. However, the distinction between biocrust and cryptogamous or just non-vascular vegetation is not always easy to make.

In summary, we agree that the prominent use of the term biocrusts in the introduction and title may lead the reader down the wrong track. This will be adjusted accordingly, and more reference to cryptogamous and/or non-vascular vegetation will be made. Nevertheless, we think that plant communities under the biocrust definition are not yet adequately described in these mesic (and thus rather atypical) ecosystems. We therefore strongly welcome the reviewers suggestion to compare and discuss similarities and differences between the communities.

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