

Comment on bg-2021-343

Anonymous Referee #2

Referee 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-RC2>, 2022

The study by Gall et al. tackles a very interesting topic about biocrust formation in skid trails and their influence on soil erosion. Overall, the manuscript is well written and the topic well presented. The measurements are numerous and have been done during different seasons and vegetation stages as well as on different soil types and parent material. The article is worth publishing, however, it could be improved in my opinion with some of these suggestions.

In general, I think that the figures could be improved, especially Figures 2, 3, 5.

Figure 2 and 3 For Figure 2 and 3 I would recommend not using line charts but possibly box plots. Since these are specific monitoring times and not continuous monitoring it gives the wrong suggestion to the reader, especially since the slope of the lines is very different (because the x-axis distances are all the same, although timewise they are not, June-July is not the same time as July-October).

Figure 2 Perhaps you could consider, for Figure 2, putting the difference between wheel track and center track in one panel (bryophytes) and the difference between wheel track and center track for total vegetation in another panel. With an adjusted y-axis for bryophytes it would be much easier to see differences between the two track types. This is just a suggestion.

Figure 2 and 3 To distinguish the information in Figure 2 from Figure 3 it might be better to use different colours. In Fig. 2 bryophytes are presented in dark green while total

vegetation is yellowish, in Fig. 3 these colours are used to distinguish the track types which makes it more difficult to grasp the information from the figure directly. Consider using larger symbols for bryophytes etc. so it is more easily readable.

Figure 5 The distribution of sample dots in Figure 5 just seems random and does not improve the quality of the figure. The information about the number of sampling points could also be added into the figure caption.

Line 148 rainfall intensity should be given as mm h^{-1} . Do you mean 45 mm in 30 minutes meaning 90 mm h^{-1} . This would be an extremely heavy precipitation event and one not typically found in the region, I presume.

Chapter 3.2.1 I understand that you want to distinguish the skid trails from the undisturbed forest, yet the results seem to show that wheel tracks and center tracks are very different in their soil erosion characteristics, maybe separate them when speaking about the total values for sediment discharge and surface runoff.

Lines 358-364 You speak of rainfall events, but you mean rainfall simulations? As I understand it, these ROPs can also be used to measure sediment loss and surface runoff during natural rainfall events, did you measure these in between your monitoring times?

Figure 5 As you write the higher the percentage of vascular plant cover or biocrust cover the lower sediment loss. Why is the sediment discharge for 11-25 % biocrust cover so low in comparison to the sediment discharge with higher biocrust cover (26-50%)? Do you think it is because of only few measurements were performed in this cover class? You should also explain not only the outlier dots but also your „sample“ dots in the figure caption.

Figure A1 Unfortunately, the rainfall simulator (except for the cannot be seen, consider using a different, more expressive picture.

Chapter 2.1 Consider adding an extra figure for the study area

Lines 27- 28 the last sentence needs work: ... biocrusts showed an average sediment loss that was 18 times lower than under vascular plants.

Line 41 important dimensions?

Line 68 bryophyte-dominated biocrusts

Line 75 very most? As the most studies

Line 127 „a“ Eutric Cambisol

Line 135 „a“ Eutric Calcaric

Line 173 Nomenclature see Table 1 and Table 2 à please use full sentences or use brackets

Line 202 no italics for citation

Table 1 no italics for the authors

Line 313 further disturbance was detrimental

Line 349 rose again

Line 352 a difference by a factor of 5.7

Lines 356-357 keep value and unit together, 59 %

Line 375 skid trail

Line 407 with an 18-fold difference

Line 417 both scouring water? Maybe remove both

Lines 437-438 The pH was identified as the main influencing...