

Interactive comment on “Bryophyte-dominated biological soil crusts mitigate soil erosion in an early successional Chinese subtropical forest” by Steffen Seitz et al.

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Thank you for your positive evaluation and helpful comments on our manuscript, which we want to address one by one:

“The topic of this paper is likely to have a substantial impact.”

- Thank you for this assessment.

“However, it is very difficult to follow the numbers of sample replicates across the study. Perhaps a table would help where the hierarchy of sampling is broken down and all in one place.”

C1

- We agree that sample numbers appear somewhat confusing, which is because the study was initially not designed to investigate BSC development. We will add a table to clarify sample numbers in the revised version of the manuscript.

“The authors also put a lot of influence on canopy cover dictating cover of biocrusts but their abiotic variables are likely influencing the canopy cover. These things should be addressed together or the abiotic setting should be controlled for when looking at canopy cover.”

- Abiotic factors were mainly used to explain biocrust covers. We agree that they are likely influencing tree development too and their influence on canopy cover is not sufficiently addressed. We will widen the discussion in this regard.

“The disturbance that is mentioned, that is the reason for the development of biocrusts is not described.”

- The potential natural vegetation of this region is a subtropical broadleaved forest with dominating evergreen species, which was replaced by a commercial forest plantation in the 1980's. This plantation was then clear-cut in 2008 and the BEF-China experiment was established (see methods 2.1, Bruelheide et al. 2014, Yang et al. 2013). We will present more information on the vegetation disturbance on the study site in the revised manuscript (see below).

Specific comments:

“Line 114: The hypotheses could be stated more clearly. (1) “Biocrusts ARE widely developed (2) “The development of biocrust is influenced by BOTH the surrounding vegetation cover AND THE soil and terrain attributes.” “

- Hypotheses will be stated more clearly, according to the reviewer's suggestion.

“Line 173- It is not clear is the analyses met the assumptions of ANOVA.”

- The dataset was tested and met the assumptions for ANOVA. We will add further

C2

information about normality and multi-collinearity to this paragraph.

“Line 185- “Than” should be “then”.“

- Changed

“Line 239- I thought that this paper was primarily about soil erosion and biocrusts but that it not clear from the first paragraph of the discussion.”

- The paper is structured along the three hypotheses “(1) BSC extend under forest”, “(2) Influence of vegetation, soil and terrain on BSC development”, “(3) Impact on soil erosion”. Thus, we used the same order in the results and discussion part. The title is pointing more on soil erosion, though, as this was the most important finding in our opinion. Nevertheless, BSC development and e.g. classified moss species are of high importance, too.

“Line 240- It is confusing to state hypotheses by numbers but quickly paraphrasing the hypothesis would make interpretation easier for the reader.”

- We agree that paraphrasing the hypotheses in the discussion part would enhance the comprehensibility for the reader. Thus, we will add short repetitions of the hypotheses at the beginning of each discussion paragraph.

“Line 241- Is there any pre-disturbance data? It is hard to understand the connection between interspaces and disturbance without some description of the pre-disturbance structure of the vegetation.“

- See above. Unfortunately, we do not have any data on BSCs and BSC development derived before the establishment of the experiment in 2009-2010.

“Line 271- Cite Condon and Pyke 2016, who have been able to restore a great deal of moss cover very quickly.”

- Thank you for pointing out further literature. The work of Condon and Pyke gives very valuable insights on moss development after vegetation disturbance and fits well in our

C3

context. We will consider this study for the revised manuscript.

“Line 321- You would have a stronger close if you finished with the sentence that ends here. It’s also unclear given your findings if there is much of a need to restore biocrusts since you saw recovery of bryophytes really quickly.”

- That is true for our specific study and this subtropical forest environment. Nevertheless, biocrust restoration could be applied in other forest environments to protect bare soils e.g. in skid trails after timber harvesting. Thus, this might be interesting to look at in further studies and other climates. Nevertheless, we will revise the phrasing of the last two sentences.

“Line 335- You should remind the reader here of your scale as this likely influenced the effects of soil attributes. The authors need to work on the storyline of the paper as well.”

- We will add further information about scale and try to improve the manuscript as the reviewer suggests.

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