Response to Reviewer Comment 2 (RC2) to

preprint bg-2021-343: "Pioneer biocrust communities prevent soil erosion in temperate forests after disturbances"

Thank you very much for your review, the positive evaluation of our work and the very valuable suggestions to improve the manuscript.

Comments	Authors responses
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)."*	Thank you for bringing this to our attention. We replaced the connected scatterplot diagrams in Figures 2 and 3 with boxplot diagrams (see Figure 3 and Figure 4).
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."*	Thank you for this recommendation. We tried the suggested display for Figure 2, but discarded it after closer examination because we would have to distinguish colour between wheel and center tracks for this representation, and we believe that it is more comprehensible to the reader at this point to stick with the selected uniform colour code to distinguish between "bryophytes" and "vascular plants". Please see also comments given by public review #1.
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."*	We decided to adjust the colour code in all figures so that dark green is used for "bryophytes" and light green for "vascular plants", which makes the figures more comprehensible for the reader.
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."*	Thank you for this comment. We removed the jitter points in Figure 5, which clearly improved the visualization (see Figure 6). Furthermore, we added the number of sample points for each cover in 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."*	We inserted more background information to the selected rainfall intensity and corrected the given unit to mm h^{-1}.
*"**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*	As suggested, we removed the mean values for the entire skid trails in this chapter and instead only dealt with the mean values per wheel track and center track.

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?"*	Yes, you are right, we mean rainfall simulations in these cases. We clarified this. Generally, ROPs can be used to measure surface runoff and sediment discharge during simulated rainfall and natural rainfall events. In our study, we just conducted measurements with simulated rainfall.
*"**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."*	In Figure 5, our measurements of sediment discharge at four different skid trails were reclassified and plotted in cover classes to represent the general influence of bryophytes and vascular plants on soil erosion. Except of the cover class "< 10 %" with 13 measurements, we have 3 – 4 measurements for bryophyte ROPs in each cover class, so this difference is not due to sample size. We assume the reason is that different skid trails are grouped together in each cover class. Cover class "11-25 %" includes two measurements of TS and one of LS, while cover class "26-50 %" contains two measurements of PT, one of TS and one of LS. In general, soil erosion was significantly higher in PT than in TS. The jitter points in Figure 5 were removed to increase comprehensibility (see Figure 6).
*"**Figure A1** Unfortunately, the rainfall simulator (except for the cannot be seen, consider using a different, more expressive picture."*	We replaced image "a" in Figure A1 (see Figure A2) so that readers can also see the Tübingen rainfall simulator inside the protective tent.
*"**Chapter 2.1** Consider adding an extra figure for the study area"*	We added an extra figure (Figure A1) for the study area in the Appendix.
*"**Lines 27- 28** the last sentence needs work: … biocrusts showed an average sediment loss that was 18 times lower than under vascular plants."*	We decided to delete this sentence in the abstract because it was too specific at this point.
*"**Line 41** important dimensions?"*	We have rephrased this sentence to make clearer that soil erosion in forests can be locally very severe.
*"**Line 68** bryophyte-dominated biocrusts"*	Thank you, we corrected this according to your comment.
*"**Line 75** very most? As the most studies"*	According to your comment, we deleted "very" in this sentence.
*"**Line 127** „a" Eutric Cambisol"*	We adjusted this.
*"**Line 135** „a" Eutric Calcaric"*	We adjusted this.
*"**Line 173** Nomenclature see Table 1 and Table 2 à please use full sentences or use brackets"*	As suggested, we have now used brackets instead.
*"**Line 202** no italics for citation"*	We removed this sentence.
*"**Table 1** no italics for the authors"*	We changed the formatting of the authors for liverwort species in Table 1.
*"**Line 313** further disturbance was detrimental"*	We corrected this.
*"**Line 349** rose again"*	We corrected this.
*"**Line 352** a difference by a factor of 5.7"*	We changed the sentence according to your comment.

*"**Lines 356-357** keep value and unit together, 59 %"*	Thanks for mentioning this, we will insert fixed spaces between values and units to avoid separating them at the end of the line.
*"**Line 375** skid trail"*	We corrected this.
*"**Line 407** with an 18-fold difference"*	We changed the sentence according to your comment.
*"**Line 417** both scouring water? Maybe remove both"*	We removed this sentence.
*"**Lines 437-438** The pH was identified as the main influencing…"*	We shortened the conclusion to the most important outcomes of our study, so that this sentence was removed at this point.

Figures

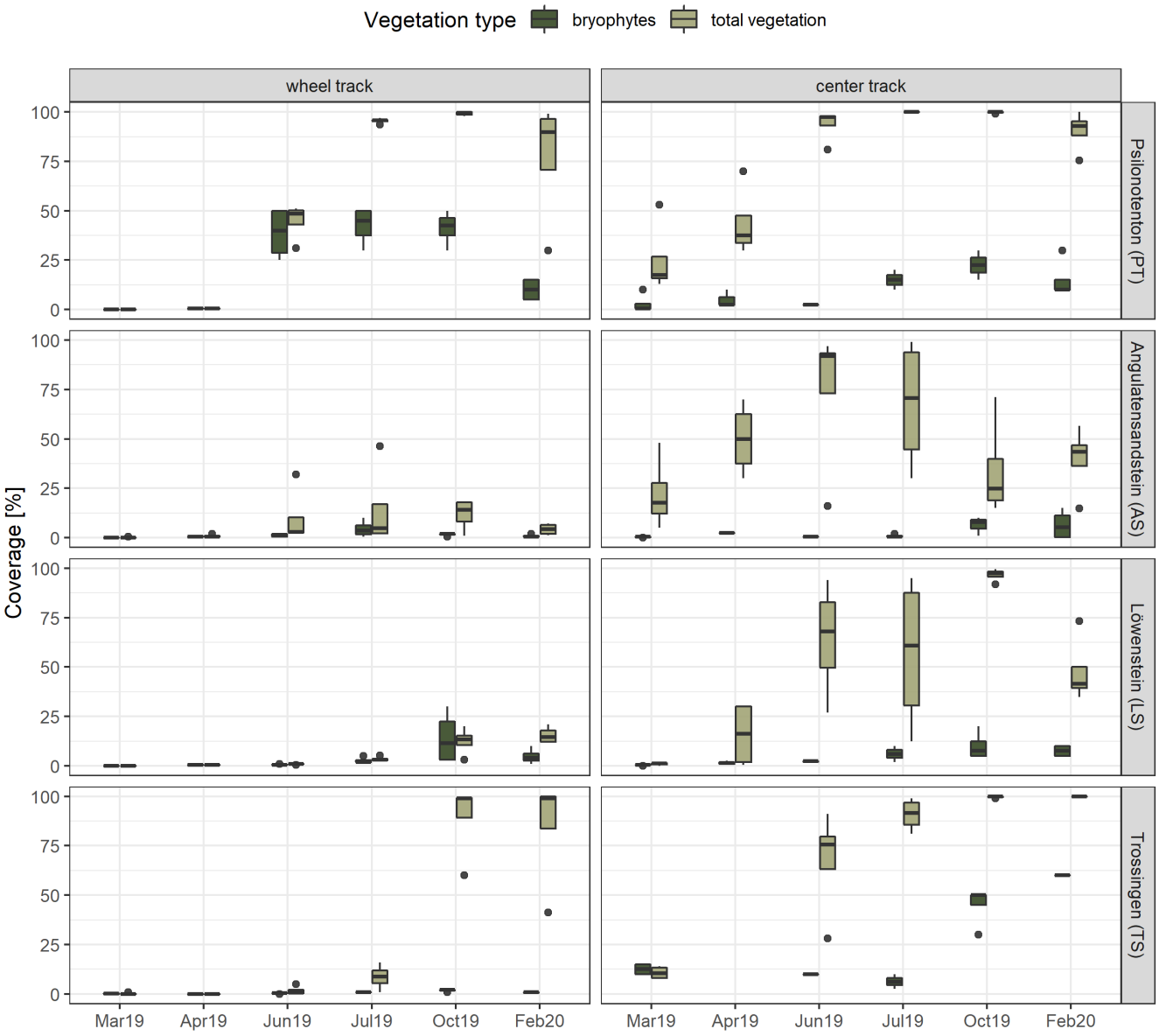

Figure 3: Development of bryophyte (n = 4) and total vegetation coverage (n = 4) per runoff plot at the individual skid trails. The bottom and top of the box represent the first and third quartiles, and whiskers extend up to 1.5 times the interquartile range (IQR) of the data. Outliers are defined as more than 1.5 times the IQR and are displayed as dots.

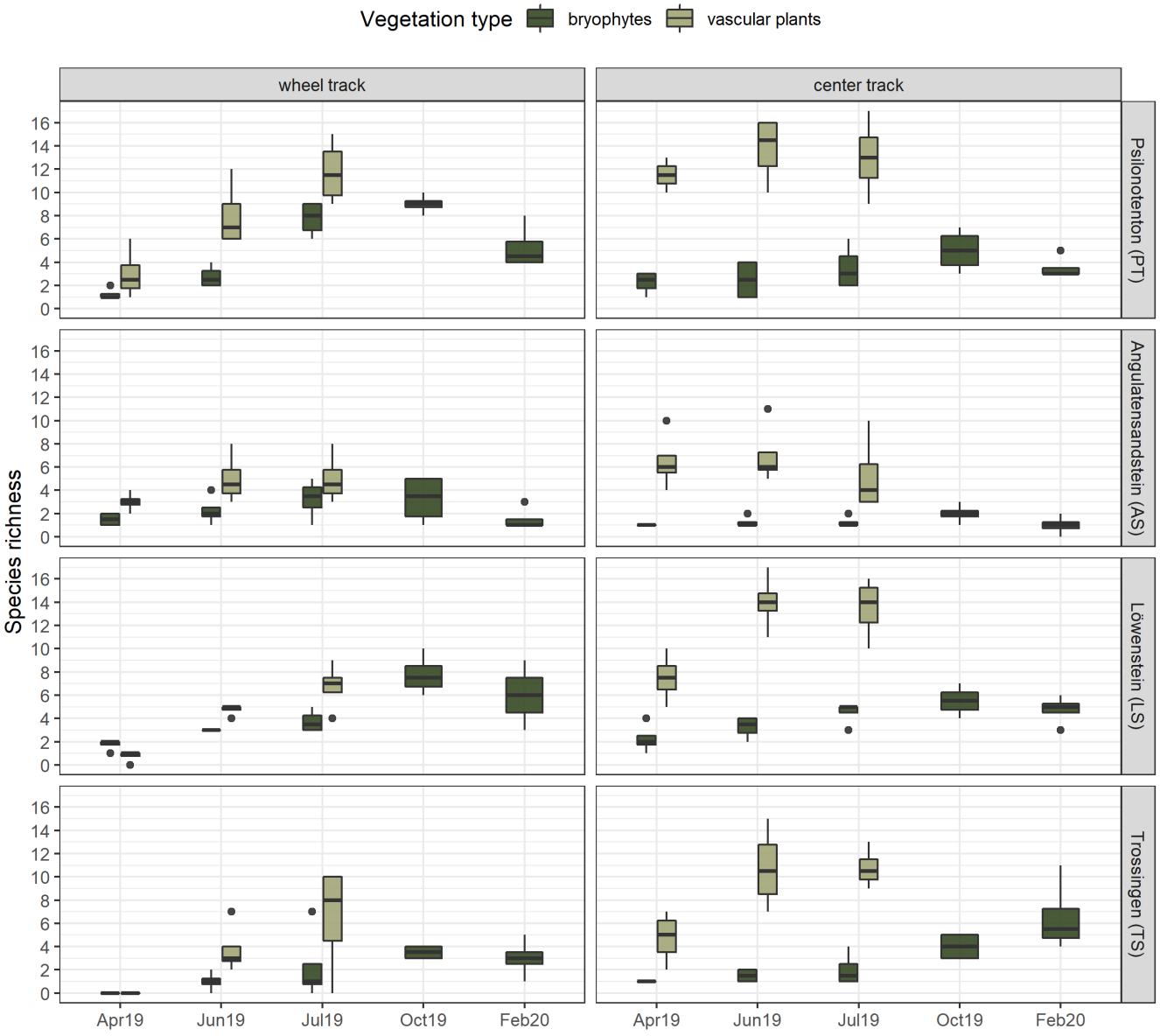

Figure 4: Species richness of bryophytes (n = 4) and vascular plants (n = 4) per runoff plot at the individual skid trails. The bottom and top of the box represent the first and third quartiles, and whiskers extend up to 1.5 times the interquartile range (IQR) of the data. Outliers are defined as more than 1.5 times the IQR and are displayed as dots.

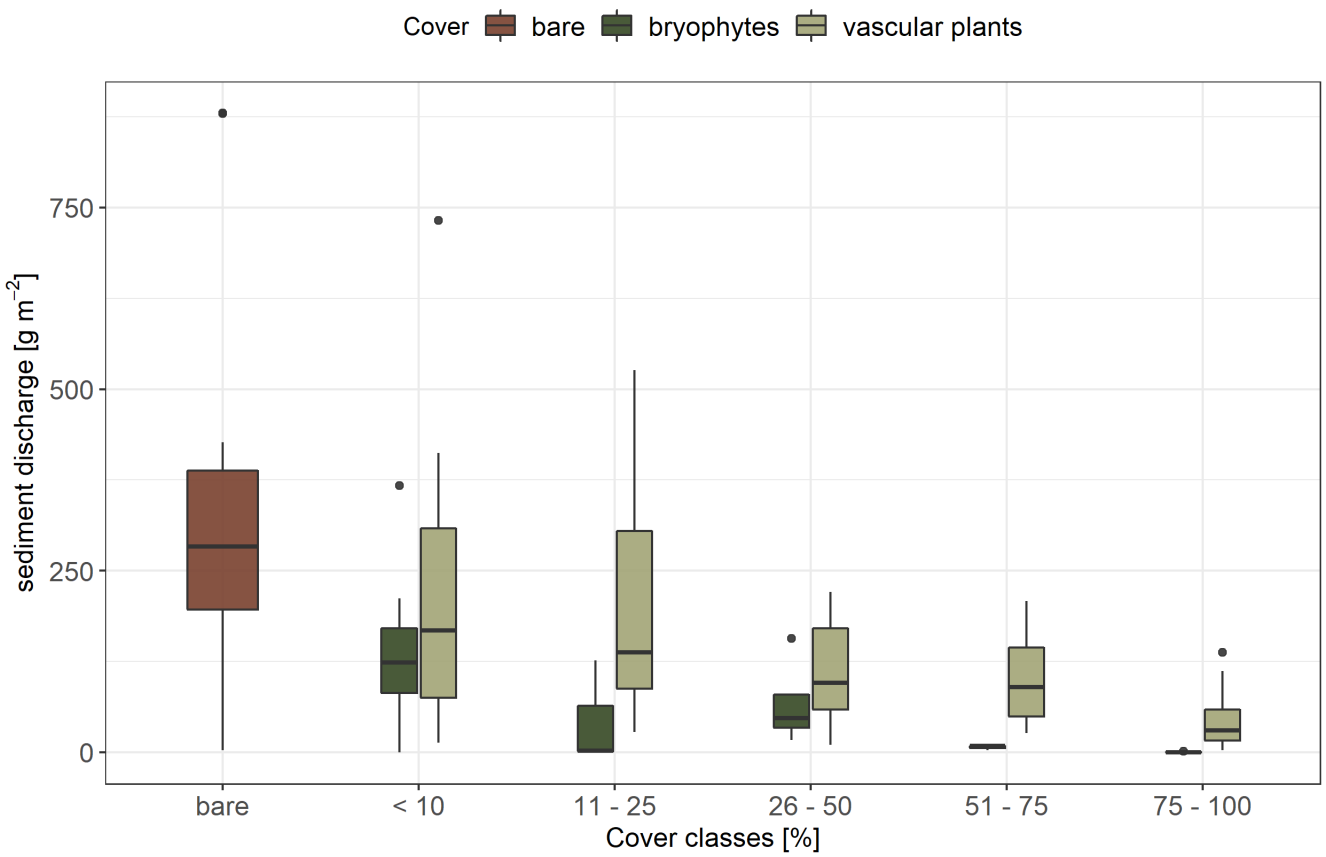

Figure 6: Sediment discharge for bare (n = 14), bryophyte (n = 27) and vascular plant (n = 58) runoff plots (ROPs) categorized into cover classes. The bottom and top of the box represent the first and third quartiles, and whiskers extend up to 1.5 times the interquartile range (IQR) of the data. Outliers are defined as more than 1.5 times the IQR and are displayed as dots.

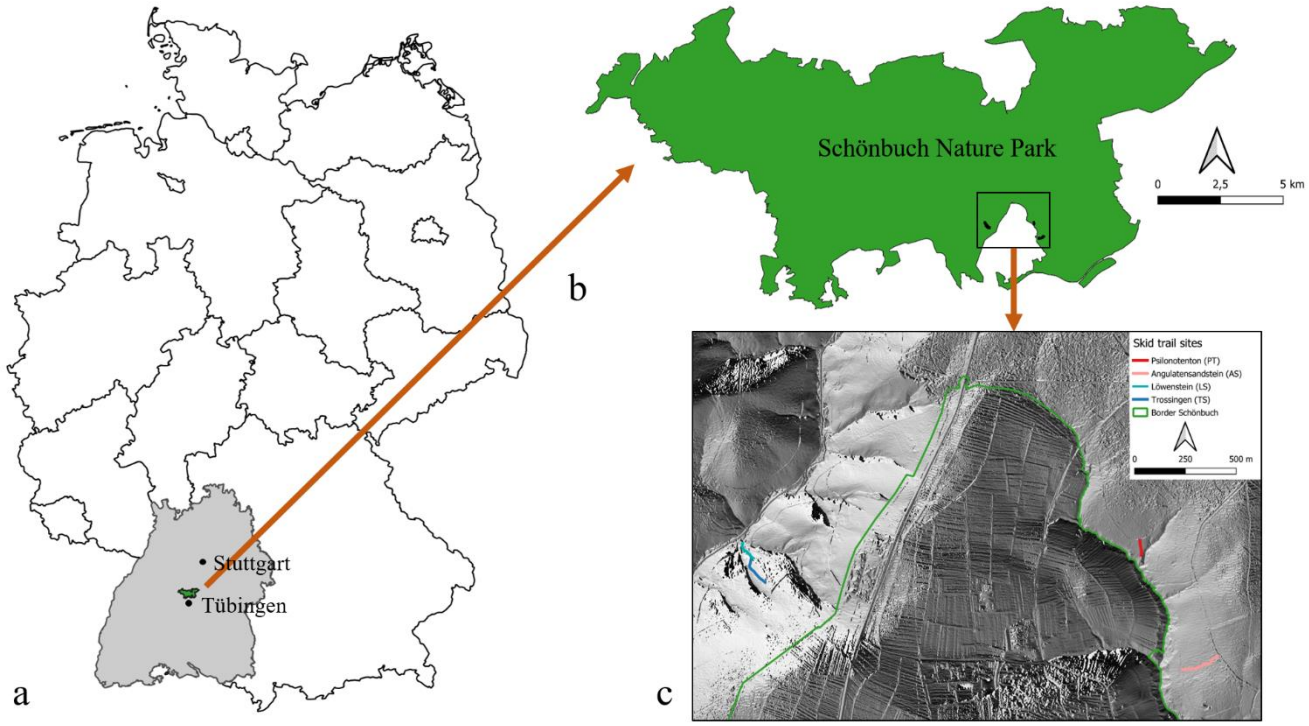

Figure A1: Overview of the study area: a) Location of the Schönbuch Nature Park in Germany, b) Location of the selected skid trails inside the Schönbuch Nature Park, c) Location of the four skid trails on a hillshade raster (Geobasisdaten © Landesamt für Geoinformation und Landentwicklung Baden-Württemberg, www.lgl-bw.de)

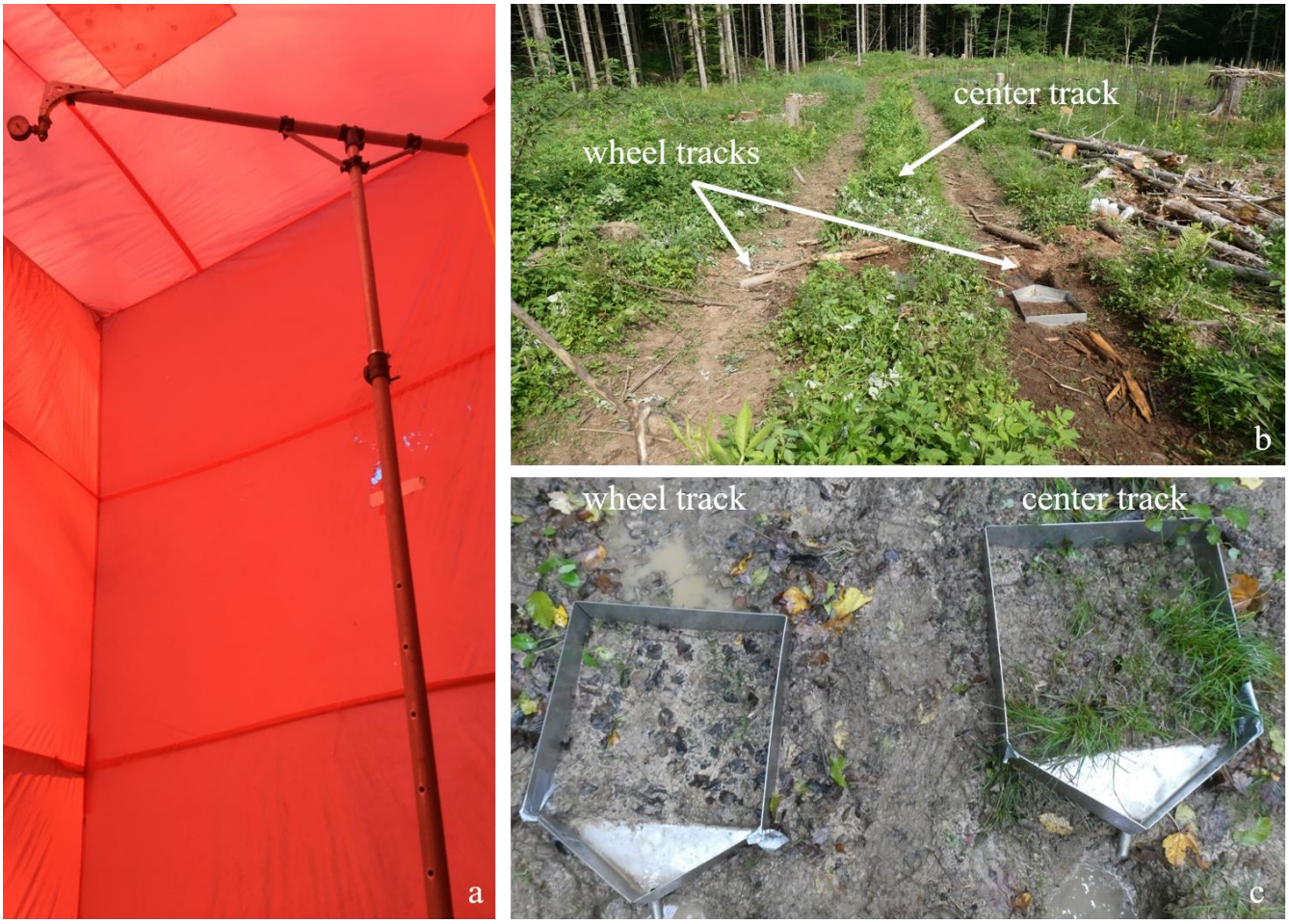

Figure A2: Experimental setup: a) Tübingen rainfall simulator inside the protective tent, b) Skid trail in the Trossingen-Formation (TS) in July 2019, c) Runoff plots in the wheel track and the center track in the Angulatensandstein-Formation (AS) in October 2019