

Biogeosciences Discuss., referee comment RC1  
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## Comment on bg-2021-26

Anonymous Referee #1

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Referee comment on "Spatial patterns of aboveground phytogenic Si stocks in a grass-dominated catchment – results from UAS-based high-resolution remote sensing" by Marc Wehrhan et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-26-RC1>, 2021

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I really appreciate Editor in-chief to invite me to review the manuscript by Marc Wehrhan et al. This is a very interesting MS, offering a fruitful experimental data and nice findings using Unmanned Aerial System (UAS). this is novelty and originality. Indeed, the abstract should emphasize new findings and their significance, with some experimental results/data. In Introduction section, authors should give an objective summary to give a promising gap regarding phytogenic Si and soil properties affecting silicon mobility, which is quite important in the new findings and their significance of this MS. Please check all relative recent references. In addition, here I am not English speaker, but still find some grammatical errors, so that it will be better to improve its English for a better understanding before further publication. Please see the below soem specific comments:

L. 15, this sentence should be rephased since it is not clear to me 'most of these studies.... condition'

L.25, referring 'i.e., i.e., comparable to or markedly exceeding reported

values for the Si storage in aboveground vegetation of various terrestrial ecosystems.', prefer authors to give experimental or analytical values/data'

L.25, add ', after 'from our results...'

L.50, here, prefer to author should also refer that 'since soil properties affect soil silicon bioavailability, leading to the change in plant silicon content (see., Li et al., 2019., Plant and Soil 438 (1), 187-203 and others). In fact, any change in soil properties would largely

affect silicon mobility and its accumulation in plants. It has been highlighted by recent studies, offering some nice evidences on this MS.

Line 37-38: Please cite relevant references to support 'in most terrestrial ecosystems phytogenic Si...' (e.g., Alexandre et al. 1997. *Geochimica et Cosmochimica Acta* 61, 677-682; Blecker et al. 2006., *Global Biogeochemical Cycles*, 20; Cornelis et al. 2010. *Biogeochemistry*, 97, 231-245. Yang et al. 2020., *Geoderma*, 361: 114036). In particular, once being returned into soil, this phytogenic Si is largely are competitive with pedogenic silica,

boosting the biological recycling of Si (Li et al., 2020., *Geoderma*, 368, p.114308).

L41-42: Other recent studies also reported that the grasses of the family Poaceae are generally Si accumulators.

Line 72-78: is it important or necessary for this MS to introduce these studies?

Line 123-124 and Line 127-128: When the aboveground biomass of *C. epigejos* and *P. australis* were sampled? Is it in 2014? Please specify.

L256-257, L265, L272, L320-321, L 324-325, L334-335, L355-356, 379-380, Line: Use italics when showing the name of the species. Please check throughout the manuscript.

L324 (Figure 6): Please change the title of y-axes to "fresh biomass (green shoot)" in Figure 6a, and change the title of y-axes to "fresh biomass (green shoot + litter)" in Figure 6b.

Li334 (Figure 7): Please change the title of y-axes to "dry biomass (green shoot)" in

Figure 7a, and change the title of y-axes to "dry biomass (green shoot + litter)" in Figure 7b.

L372-403: a bit confusing about this section. Right now, the relationship between Si stocks of *C. epigejos*, *P. australis* and site properties was dubious just by comparing the variation trends between Si stocks and examined soil properties in different zones (e.g., Line 388-389: Among the examined soil properties, means of clay content (Fig. 10a) show a corresponding trend with respect to Si accumulation in dry biomass of *C. epigejos* for all three zones.). Could you perform statistical analyses between Si stocks (*C. epigejos*, and *P. australis*, respectively) and different site properties to show their relationship. At least Pearson correlation analysis is needed.

Line 379 (Figure 9) and Line 391 (Figure 10): What does the data on the top of box represent? Mean or median? What does the bottom and top bars represent? Please specify.

Line 379 (Figure 9) and Line 391 (Figure 10): Right now, the readers do not know whether there are significant differences between zones. Could you perform significance test between t-he zones to show the significant differences?

Line 401: Could you offer the data of soil moisture to support this conclusion: "As stated before, the occurrence of *P. australis* is governed by soil moisture conditions".

Line 432-434: also recommend some latest literatures (straw remove, return, land use and management change)to support this point. e.g., "Li and Delvaux 2019. *GCB Bioenergy* 11, 1264–1283" and "Yang et al. 2020. *Plant and Soil*, 454:343–358".

L442-443: I confusion whether the climatic factors could govern the composition and structure of plant communities at Chicken Creek. I think the differences of climatic conditions may be negligible at such small catchment.

L506-515: In my side, the current Conclusion is more like Discussion or Outlook. prefer to move this paragraph to the end of Discussion section.

L505: recommend the authors reconsider the Conclusions section by combining the main findings and significance of this study or answering the three major research questions raised in Introduction section.