

Biogeosciences Discuss., referee comment RC2
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Comment on bg-2020-467

Anonymous Referee #2

Referee comment on "Microbial and geo-archaeological records reveal the growth rate, origin and composition of desert rock surface communities" by Nimrod Wieler et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2020-467-RC2>, 2021

Manuscript: „Estimating the growth rate in desert biological rock crust by integrating archaeological and geological records by Weiler et al. is valuable study of biocrust concerning its origin, taxonomy, isotopic composition, and growth rate. Bellow there are some comment.

Major comments

Manuscript title focuses solely on „growth rate“. Large portion of manuscript is nevertheless focused on bacterial communities based on RNA sequencing and also on isotopic composition of rock and crust. These two topics should be also mentioned in paper title. Paper title should be changed, for instance: „Desert biological rock crust: Bacterial diversity, isotopic composition and growth rate“. This might better express manuscript content.

Also abstract should better correspond to manuscript content. There is not a single sentence on isotopes for instance.

Conclusion is very short and not much reflecting findings of the manuscript. It should be rewritten to cover all important findings of the paper.

As one of the most important results of the paper is the growth rate of biological rock crust, it is important to describe on how many samples the thickness 0.1 -0.6 mm was

measured.

Line 149: Authors state that: „Our analyses invalidate the lithology role in shaping the BRC composition“. In fact not really, as limestone and chalk are both calcite rich, so from many respect very similar lithologies. Statement is too strong, not supported by data. Statement should be changed or more evidence is needed.

Minor comments

Fig. 1 Colors in figure are so dull that individual lithologies can only hardly be recognized. Colors should be brighter. Also, what means the red color, which lithology?

Lines 80-90: Concerning O a C isotopic values, the name of standard should follow after values (like -3‰ VPDB)

Fig. 3 The description of horizontal axis "d13C/a18O" may confuse that ratio of C/O isotopes is used. Better would be: "d13C and d18O". It would be nice to separate in graphs which part of the data are in crust and which are measured below the crust (for instance using black dashed line as base of rock crust or highlight the rock crust by grey color)

Fig. 4 Figures A-D have small fonts, especially the B which is way too small.

Better alignment of individual parts of figure will be

A C

B

D

So that B a D would have whole width of page.

Line 130 "Overall, the results point to a very deterministic successional course of BRCs development." Meaning of sentence is not clear, please rewrite.

Line 223-225. It seems that O isotopes are in fact referenced with respect to VPDB rather than VSMOW. Otherwise, O isotopic value of marine limestone would not be close to 0. Anyway, this should be clear from manuscript.