

Biogeosciences Discuss., referee comment RC2
<https://doi.org/10.5194/bg-2021-107-RC2>, 2021
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Comment on bg-2021-107

Anonymous Referee #2

Referee comment on "Geodiversity and biodiversity on a volcanic island: the role of scattered phonolites for plant diversity and performance" by David Kienle et al.,
Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-107-RC2>, 2021

General comments:

The manuscript is about the effects of parent material (phonolite vs basalt) on plant diversity and performance. The manuscript reads well and is statistically sound, but the key results appear rather ordinary as one would expect what has been observed: the diversity and plant performance differs between the two parent materials. Although reference is made that the findings are likely to occur also on other islands (or in any regions with and without phonolites), it rather seems of local relevance in its present form. Therefore, the novelty of the study seems limited or needs to be developed further.

A key short coming is the lack of biogeochemical and microclimatic data. Although the study has an interdisciplinary aim and discusses biogeochemical mechanisms to explain the observed plant diversity pattern, it does not include any data on biogeochemistry or soils (e.g. nutrient status, texture, water holding capacity, soil organic matter) or microclimate. It even appears that one of the rock types contains serpentinite, but although this has fundamental impacts on plants, data are lacking and it remains unclear to which extent serpentinite contributes to phonolite (or basalt). Moreover, some regions on La Palma are rather dry (no data are given in the manuscript), but the modifying role of parent material on water storage (via texture, color, soil depth etc.) remains unexplored. I am trusting the authors that there are geochemical/site differences, but I am convinced that the reader of Biogeosciences (and me) expects the authors to dig deeper and provide a more quantitative links between plants, microclimate, and biogeochemistry.

Overall, the novelty of the findings appears rather limited and the amount of data shown seem insufficient for a biogeochemical journal. In my eyes, the authors have to provide additional data requiring a rewriting of the manuscript.

Specific comments:

Line 19, 20 The 3rd sentences reads trivial; I suggest to combine it with the second one.

Line 21 'traits' is a term that is hardly used by geologists; I would find characteristics more adequate

L. 23 replace 'accumulating' by 'growing'

L.37 impacts of geodiversity on biodiversity have long been under-researched – I do agree that it has largely been ignored but 'geobotany' is an established field (e.g. Ellenberg)

L. 86 somewhat early to start in the 'we-form' in the introduction

L. 90 rephrase the sentence

L. 126 Hypothese i. Link of plant species richness and growth conditions? This is an interesting one and appears somewhat abrupt and not necessarily the case - it requires some introduction beforehand

L. 139 Methods and information provided are minimal. Please provide climate data and some basic soil (substrate) data (e.g. pH). Climate on La Palma is highly heterogenous and these conditions may also affect vegetation distribution also indirectly via differently textured (=here grain sizes) parent material

L. 232 surface texture – replace texture as for the biogeochemical reader, texture is related to clay, silt and sand.

L. 235 ff brightness and albedo - any soil temperature measurements available? In current times, records on temperature (and moisture) using in situ loggers are a standard measure in biogeochemistry.

L. 243ff grain size: how would grain size modify water storage? What was the annual/seasonal precipitation at the sites? Do differences between phonolite and basalt

vary between the four sites?

L. 281ff serpentinite. Based on the information given, it is unclear, which of the parent materials contains serpentinite.