

Interactive comment on “Land use change affects biogenic silica pool distribution in a subtropical soil toposequence” by Dácil Unzué-Belmonte et al.

Anonymous Referee #2

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The paper “Land use change affects biogenic silica pool distribution in a subtropical soil toposequence” addresses an important question on which there is so far not much data available, i.e. what changes occur in different Si pools in soil as a consequence of (anthropogenically induced) environmental changes. While the only totally new aspect is the subtropical site studied, the concept is relevant as anthropogenically induced changes in land use and erodibility of soils will, very probably, increase further in subtropical areas. The paper (title, abstract, scope, conclusions) also delivers more or less what it promises: some more work is however needed on the analysis and presentation of the results. The subject is well situated within the scope of the publication.

It is to the authors' credit that they use a fairly novel and under-utilized methodology which makes it easier to differentiate between biogenic and non-biogenic, ecologically and non-geologically speaking potentially relevant Si pools. The description of the

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methodology is also (to my, admittedly, fairly well prepared) mind quite adequate and would enable reproduction (with the proper equipment). The field study appears to have been well conducted, although the crops cultivated on the steep and less steep slopes should ideally have been more similar: in this section some more effort to ensure that everyone understands where what samples were taken could have been shown (see specific comments below).

The main weaknesses of the paper are the absence of explicit statistical analyses, the presentation of the results and the discussion of these: the authors could and should make these sections substantially clearer and improve the quality and readability of the paper quite a lot this way. The introduction and most of the methodology sections are quite well written linguistically, but unfortunately the quality of both the text and the structure of the presentation deteriorates towards the end. The results are very likely indeed sufficient to support the interpretations and conclusions, but this should be proven by some kind of statistical analysis (even the use of simple t-tests would improve the paper considerably). These interpretations could also be presented in a clearer fashion (and perhaps the authors would themselves get more out of the results). The citation of existing literature on the subject is adequate (bearing in mind that it is limited).

I think that the paper is well worth publishing as it presents relevant results obtained by appropriate methods and draws fairly good conclusions, but I would recommend that statistical tests are added and quite a lot of the text rewritten.

Specific, technical comments:

The Abstract and Introduction are both well written.

In the Methods-section, it is not quite clear to me what sort of tillage is used (section 2.1 rows 82-).

In section 2.2, please specify how the soils were dried (temperature?). You could

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perhaps refer to Fig. 2 here?

In section 2.3, how were the representative pits selected? How were the rest used and why? Please make this clearer! I also hate acronyms and question whether you really need the complicated ones you have designed . . . ?

Please also check the overall quality of the language used (starting here); in many instances better words could be used (e.g. not differenced, row 118, smaller THAN or equal to, row 124, nearly linearly dissolving, row 125). Starting from section 2.3.1 the readability of the text also deteriorates somewhat: please consider that this is not a list but a paragraph (e.g. line 127). The paragraph starting on line 151 is, in particular, very raw text (with even capitalization completely haywire) and should be entirely rewritten. Similar specific problems occur throughout the discussion e.g. line 288, 306, 325,328,329, etc.): please have a native speaker check the language once more!

I would also recommend that you re-structure sections 2.3 and 2.3.1 and separate e.g. (laboratory or physicochemical) analyses and calculations into separate sections – it is not that relevant which analyses were made on selected pits and which not. The section on averaging and accumulation is now very hard to follow.

In the Results-section, I would put the supplementary data on AlkExSi-concentrations either together with the bulk data (isn't what is presented in section 3.1 minearology, besides, rather than physico-chemical characteristics?) or after the main results (the pools) as a "footnote". Now it confuses the reader, or at least me: why first concentrations and then pools?

The listing of averages starting on line 182 is not necessary: you already have them in Table 2! Do a general overhaul of the results section and check that what you mention in the text really is necessary and helps the reader to understand what you are talking about, not only a list of numbers.

I would put your result summary into the discussion!

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Discussion: section 4.1 is really depth distribution within the soil, isn't it? Could the section header reflect this? And why don't you start with the comparison to other studies now starting at line 240? Likewise, I would begin section 4.2. with a separate paragraph containing the sections on bulk numbers in cropland and forest now within lines 250-253 and 268-272, with or without a separate heading.

The section on crop rotation (line 258-262) is perhaps more land use change than erosion?

Don't you have any references for the effects of erosion on Si pools in forest (line 273-)? Section 4.3. is relevant (but check the language) but would fit better into the discussion later, before the Implications. These are OK; I would perhaps also mention the changes in the non-biogenic pools.

I like your figures, but please ensure that all numbers are of readable size! Especially in Fig. 4 with green background the numbers could be clearer.

Interactive comment on Solid Earth Discuss., doi:10.5194/se-2017-21, 2017.

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