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Biogeosciences
Discussions

Interactive comment on "Calcium content and high calcium adaptation of plants in karst areas of southwestern Hunan, China" *by* Xiaocong Wei et al.

Anonymous Referee #2

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My comments

1. General comments

The authors' manuscript "Calcium content and high calcium adaptation of plants in karst areas of southwestern Hunan, China" introduced an investigation and an analysis of the relationships between the degree of rocky desertification and calcium content in soil and plant. The author's results are interesting. These results can be seen as a valuable reference, which could be helpful in related research works to screen plant species for vegetation restoration in karst areas of China. As for the study itself, this paper is worthy to be published in the journal "Biogeosciences". However, this

manuscript needs a major revision before publication, especially revisions in paper structure and writing quality.

2. Specific comments

Because there is no line number in the manuscript that I downloaded, I suggest the authors put numbers for each line in the revised version if the manuscript goes to the next stage. Here I provide my comments for the sections.

(1) For "Introduction"

In the section of Introduction, I cannot find sufficient reviews or introductions of existing studies on the issue addressed by the authors' study. There are only two existing studies (Zhang 2005; Ji et al., 2009) mentioned in this section. The study background need be introduced more in this section. I wonder if the authors can provide a brief review for this issue including some important related studies reported for other countries. Readers may want to know whether the authors' hypothesis, "the dynamics of Ca content is significantly affected by the grade of rocky desertification", is supported by more studies or not.

The second, third, and fourth paragraphs are lengthy in describing the knowledge of plant physiology. I suggest shortening them to several sentences for outlining some key processes.

(2) For "Results"

The major problem is that there are lots of explanations and analyses in this section, especially in section 3.2.2 and 3.4. Of course, for a better understanding, it may be ok to arrange a few explanations in "Results". But any analysis should not appear in the "Results". Otherwise, this section can be "Results and discussions".

(3) For "Discussions"

Overall, there are still too much knowledge descriptions of plant physiology. I think

that only the necessary knowledge should be mentioned corresponding to the new findings, instead of a detailed introduction of knowledge. I would rather see that the discussions focus on the main points and your hypothesis, or analyze your main work, for example, the three parts of your work: (i) to measure the soil Ca contents; (ii) to compare between above- and below-ground parts of plants; and (iii) to analyze correlation between Ca in plants and soils.

For section 4.1:

According to the text, the authors may discuss their works (i) and (ii) in section 4.1. However, section 4.1 seems not well organized. Actually, the results have already shown the dynamics of soil Ca, and the difference between above- and below-ground parts of plants. I hope the section 4.1 can summarize these two works clearly, and can indicate some new findings. In addition, for readability, readers may need to know percentages of your measurements to the values reported by other studies. I also suggest the authors consider changing the title from "Dynamics of Ca content in plants and soil" to "Dynamics and ranges of Ca content in plants and soil" since most parts in this section are talking about the "ranges".

For section 4.2:

The authors' work (iii) was discussed in this section. It seems to me, the content needs to be reorganized very logically. Section 4.2 lists some results and other researchers' conclusions, however, the logical relationships between those results and conclusions are not clear. For example, the first sentence states "The Ca2+ content in plant cells was proportional to soil Ca2+". Then what parts of plants are you talking about? Above-ground, below-ground, or whole tree?

The second sentence states "Calcium-rich soils caused cells to absorb more calcium than the 10 cells themselves require (White and Broadley, 2003)". Then is this cited sentence for supporting the first sentence, just explaining the cause, or conducting the third sentence? A conjunction word seems necessary.

The third sentence states "Zou et al. (2010) showed that soil ECa content and leaf calcium content [were] extremely significant positive correlation". Is this conclusion cited for comparing your results? If so, it would be better to indicate the plant name(s). Your next statement is "our results showed several plants (. . .. . .) and soil Eca content was a positive correlation, but most plant calcium content and soil ECa content was not relevant". Zou et al. focused on the leaf, but, do you focus on whole tree? The results and comparisons need to be explained more clearly and logically to avoid reader's confusion.

These above writing issues are raised just for example. The whole section needs to be rewritten for better readability.

For section 4.3:

This section discusses the most important scientific issue (High calcium adaptation of plants) addressed in the study. The solution of this issue may provide useful guidance on vegetation restoration. However, basic knowledge descriptions take up lot of space. I had liked to see the discussions on: (a) Based on study results for the 17 selected species, what are the primary characteristics for each of the three categories (Ca-indifferent plants, high-Ca plants and low-Ca plants)? (b) What should the screening of plant species notice in the vegetation restoration? (c) What are the application prospects in solving the problem of land degradation using the authors' results in karst areas? (d) Is there any unsolved issue, related with this study and remained for further research?

Again, results are interesting and helpful for associated studies. I suggest accepting this manuscript after a major revision. The writing quality should be improved, including a spelling check. As I am not a native English speaker, I will not suggest more regarding language. Good luck!

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