

Dear editor:

I have revised the Ms according to the suggestion as followings:

Comment by Jeremy Owens

I would like to show thanks to Jeremy Owens for his reminder of the reference. I have corrected as following:

Question: There are several citations where the authors first and last names have been reversed.

Response: Indeed, the author first and last names were reversed. Now, I have carefully checked every reference.

Question: additionally, weathering of carbonated would have limited effects on the isotope system as well. Thus, I would suggest using the citation of Owens et al. (currently Jeremy et al.) for missing carbon sink should be discussed in a more thorough manner.

Response: As far as the missing carbon sink, I checked some new information. The referece (Sundquist, 1993) is suitable. The carbon isotope system may be related to complex conditions. For example, Hoefs J (1997) presented that the CO₂ from carbonate corrosion has carbon isotope of -3‰-+1‰ under acid conditions, which is sharply higher than that of SOC. The studied area is reported to be located an area with acid rain.

Anonymous Referee #1

Thanks indeed for the reviewer' useful comments, which help us to improve the Ms. And thanks the reviewer to recommend to accept with minor revision. I have revised the manuscript according to the comments:

Question:Page No.1, Line No.39-41: What is the importance of this Karst areas for measuring soil CO₂ concentrations, explain it with the proper references.

Response: Yes, there should be some proper references (Li and Yuan, 1995; Martin et al. 2013)

Question: Page No.1, Line No.41-43: Re-write the sentence "Therefore, some workers have looked for the "missing sink" within the absorbed and released carbon in karst systems, and the estimated values reach a dominating part (almost 1/3) of the missing sink (Jiang and Yuan, 1999)". What does the mean of " some workers" in the following sentence, which needs to be correct.

Response: "some workers" should be " some scholars"

Question: Page No.2, Line No. 52-54: The science questions which posed by the author needs be to addressed properly.

Response: Yes, we have addressed it again, and some expression was revised.

Question: Page No. 2, Line No. 87-89: Re-write the sentence, It's not clear Page

Response: The sentence is changed into " In order to comprehensively reveal characteristics of soil CO₂ concentration in karst area, soil profiles of different

stratigraphic units and vegetation types were selected. And profiles in carbonate or non-carbonate areas were both involved”.

Question: No.6, Line No. 176-181: Discussions are not properly addressed. Re-write the sentence.

Response: we re-wrote the sentence in such way: The reason for non-significance ($P > 0.05$) may be that soil CO₂ concentration is related not only to SOC, but also to soil respiration and microbe activities. However, there is no such tendency in carbonate areas as that in shale areas (Table 3), and even those of Banqiao O_{1m} farmland profile and Banqiao P_{1m(q)} shrub profile show increasing tendency. Previous studies in carbonate areas as Shilin, Lunan City and Guizhou Plateau also showed no correlation between CO₂ concentration and SOC (Liang et al. 2003).

Question: I suggest author of this manuscript to look into and revise the abstract in accordance with the results of this manuscript, which is missed in the current version.

Response: I have checked the abstract carefully. The percentage of decreases deep soil CO₂ is 5.2-66.3%.

Question: I suggest to author to improve the quality of the figures like increase the font sizes on both axis, label sizes which needs to redraw for a the better representation and visualization

Response: It is good idea, we have increased the font sizes from 11 to 18 on both axis, label sizes.

Question: Page 14, section 3.7: I suggest the author to look into it and can be revised the sub-section as " The major controlling factors of decreased CO₂ concentrations".

Response: Yes, I have revised the sub-section.

Anonymous Referee #2

Thanks for the reviewer's comments and recommendation for possible publication, and I have revised the manuscript as followings:

Question: Page 2 Line 51, "no detail documents detailing. . . .", "detail" is repeated here;

Response: Yes, it is repeated, i have corrected it.

Question: Page 2 Line 81-82, "among which only Ordovician and Permian Strata appear together", the sentence is not clear, what does this sentence means?;

Response: the part "among which only Ordovician and Permian strata appear together" should be deleted here.

Question: Page 4 Line 129, what does "significantly congressed at 0.005 level, it should be " significant correlation at 0.005 level" or not?;

Response: Yes, it should be "significant correlation at 0.005 level.

Question: Page 6 Line 169-170, " Results are given. . . . areas", the sentence is not clear, rewrote the sentences.

Response: the sentence should be "Results are given in Fig.4, among which, Fig. 4 a-h, indicate profiles in carbonate areas and Fig. 4 i-l indicate those in non-carbonate (shale) areas."

Question: Page 6 Line 177, "which means" is repeated here;

Response: Yes, it is deleted.

Question:I would like to suggest the author show the suitable map for Figure. 1. Maybe the exact location can be shown by the general location and then in 2 or 3 step so as to be acquainted by other researchers.

Response: Good suggestion, We revised the picture, which includes “Yunan province” “Zhaotong City” and “ the locations of Zhengxiong and Weixing county”

Question:The unit for the ordinate in Figure.6 should be provided

Response: we have added the unit(‰).