

Interactive comment on “Characteristics of soil profile CO₂ concentrations in karst areas and its significance for global carbon cycles and climate change” by Qiao Chen

Qiao Chen

qchen5581@163.com

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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

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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 O1m farmland profile and Banqiao P1m(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 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.

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