

Response to Referee #1

The review of the article “Constraining the soil carbon source to cave-air CO₂: evidence from the high-time resolution monitoring soil CO₂, cave-air CO₂ and its δ¹³C in Xueyudong, Southwest China” by Min Cao, Yongjun Jiang, Jiaqi Lei, Qiufang He, Jiabin Fan, Ze Zeng. The authors present the data on CO₂ in the soil, cave stream, and cave atmosphere (Xueyu Cave, China) and its surrounding. The data were gathered during the period of 2015-2016. The aim of the article is (1) to understand the quantitative relationship between all the forms of CO₂, (2) to reveal their sources, and (3) to understand the factors that control the cave air CO₂ variations. The topic of the article is important and is worthy of publication. In the article, however, there are some aspects that require revision and other ones that could be substantially improved before publishing. My main reservation is that the conclusions should be better proved by a data analysis (e.g., Cross-correlation Analysis). The results of the data analysis should be presented and discussed in detail. The data sets are nice, but they could be much better presented. The x-axis should be more extended in order to be better distinguishable individual fluctuations in the variables.

Answer to general comments:

We would like to thank the referee for his generally positive comments. We will pay more attention in presenting and explaining our data in the final version.

Other comments: Throughout the text, it is important to distinguish CO₂ itself from CO₂ concentration and pCO₂ (e.g., the lines/paragraph 85). The expression “PCO₂ in the water” (stream pCO₂ is acceptable only as an abbreviation in the text. Furthermore, it is important to explain that it means pCO₂ of gaseous CO₂ that would be in equilibrium with aqueous carbonates. In principle, pCO₂ is dimensionless variables (or it has units of pressure). If the CO₂ quantity is given in ppmv units, it means “CO₂ concentration”. Some soil characteristics should be given in the paragraph Study Area. More detail information should be given in monitoring/calculating of the stream CO₂ in the paragraph Methods and Materials. The x-axes in the plots (Fig. 2, 3, 4, 5) should be better divided (e.g., by one month, three months, etc.). The secondary y-axis in Fig. 4 should represent “Precipitation”. I do not understand what the conceptual model in Fig. 7 brings new/beneficial. In the text, there are missing the citation: Liu and Zhao 2000, and Baker et al., 1998 and 2014, referenced in the Reference list.

Answer to other comments:

- 1. We put more details in the study area part, the method part and discussion part, and refined the conclusions too.*
- 2. pCO₂ only refers CO₂ in aqueous form. We checked the use of CO₂ itself and pCO₂ to make sure that they are expressed in the correct form in the revised text. In most cases, it is not in equilibrium with aqueous carbonates, which can be seen in Fig. 8.*
- 3. We updated the division of x axis in some figures and the mistakes in the Fig.4. But the range of x axis only several days, e.g. in Fig.3.4.*
- 4. Regarding to the references, we checked all the manuscript to make sure that the citations in the maintext are all consistent with the ones in the reference list. References by Liu and Zhao 2000, and Baker et al., 1998 and 2014 were cited in the previous manuscript but then cancelled*

in the maintext without removing from the reference list.