

Interactive comment on “Constraining the soil carbon source to cave-air CO₂: evidence from the high-time resolution monitoring soil CO₂, cave-air CO₂ and its $\delta^{13}\text{C}$ in Xueyudong, Southwest China” by Min Cao et al.

Anonymous Referee #1

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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 $\delta^{13}\text{C}$ in Xueyudong, Southwest China” by Min Cao, Yongjun Jiang, Jiaqi Lei, Qiufang He, Jiaxin 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

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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. 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 PCO₂ 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.

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2019-66/bg-2019-66-RC1-supplement.pdf>

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