



The high-frequency monitoring results revealing soil CO₂ contributing to the cave-air CO₂——a case study from Xueyu Cave, SW China

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Cave CO₂ plays an important role in carbon cycle in a karst system, which also largely influences the formation of speleothems in caves. The partial pressure of CO₂ (pCO₂) of the cave air and cave stream in Xueyu Cave was monitored from 2015 to 2016. The pCO₂ variations in cave air and stream over two years showed very similar trend in seasonal patterns, with fluctuated high CO₂ concentrations in the wet season and steady low CO₂ concentrations in the dry season. Soil CO₂ which is largely controlled by soil temperature and soil water content as well as stream degassing are main origins for the Xueyu cave air pCO₂. Moreover, the contribution from soil CO₂ is higher in June (78.8%) than in November (67.1%) using the model of carbon stable isotopes. Stream pCO₂ degases from upper stream to downstream in the cave, resulting in slightly decreased pCO₂ but increased carbon isotope values in the downstream. The influence of these regional controls provides a better understanding of modern interaction between cave CO₂ sources, transport paths and mechanisms, which is very useful to reveal environmental and climatic information based on stalagmite records.