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## Study on Seasonal Variation of CO<sub>2</sub> Concentration in Xueyu Cave, Chongqing

WANG Fengkang<sup>1,2</sup>, REN Kun<sup>1,2</sup> and MO Xue<sup>1,2</sup>

*1 School of Geographical Sciences, Southwest University, Chongqing 400715, China*

*2 Key Laboratory of Eco-environments in Three Gorges Reservoir, Ministry of Education, Chongqing 400715, China*

Caves, one of the most important forms of karst topography, are very important tourism resources. Compared with the external atmospheric environment, the environment inside a cave is relatively closed and stable. Cave air CO<sub>2</sub> concentration is the most important indicator of the cave environment. Xueyu cave is located in Fengdu, Chongqing. It is Chinese 4A level scenic spots, Cave science base in China, Cave observation station of China and famous for its sediments-speleothem which is “white as snow, pure like jade”. There is a growing concern about the high value CO<sub>2</sub> concentration in Xueyu cave, Chongqing. According to the monitoring data from 2010 to 2012, The highest CO<sub>2</sub> concentration in Xueyu cave can be up to 12000ppm. And CO<sub>2</sub> concentration in cave so high is very rare. The concentration of CO<sub>2</sub> in Xueyu cave have a significant seasonal variation, The general feature of the seasonality in Xueyu cave can be concluded that higher CO<sub>2</sub> concentration in summer and lower in winter. In November each year, the concentration of carbon dioxide rapidly decrease to very low concentrations, and

gradually increase during March and April. Through frequently monitoring on soil CO<sub>2</sub> concentration, CO<sub>2</sub> concentration of cave, pCO<sub>2</sub> of ground river. The result shows that: (1) The change tendency of carbon dioxide concentration in cave is similar to the overlying soil CO<sub>2</sub> concentration, and the carbon dioxide changes in cave relative to the overlying soil carbon dioxide have a certain lag. (2) Obviously, CO<sub>2</sub> concentration variation of Xueyu cave can be derived from the variation of upper soil CO<sub>2</sub> concentration, which is sensitive in responding seasonal climatic variation for its bioactivity. In conclusion, Xueyu cave is a typical example that the ground river plays a key role in CO<sub>2</sub> transferring. Ultimately, it attributes to the response of biological activities which due to the soil temperature variations in the soil layer to changes in seasonal weather conditions.

**Key words:** Xueyu cave, CO<sub>2</sub> concentration, Seasonal variation

\* Corresponding author. E-mail: wangfengkang@163.com