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The Hydrochemistry Variations and Carbon Sinks of Groundwater in Xueyu Cave during A Rainstorm, Chongqing, China

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It is a crucial stage to study the hydrology and geochemistry of the underground river during the storm periods. The monitoring of the hydrology and geochemistry of underground river in Xueyu cave was performed from June 13 to June 15, 2011. The groundwater chemistry type was found to be $\text{HCO}_3\text{-Ca}$. The geochemistry parameters of pH, conductivity and water temperature response to rainfall quickly, the lag was about 4 hours. Affected by the piston effect, the conductivity, HCO_3^- and Ca^{2+} rose in a small extent during

prophase rainfall; and the dilution effect made the conductivity, HCO_3^- and Ca^{2+} decline after the rainfall precipitation, and the calcite saturation index declined with Ca^{2+} . The water temperature of underground river rose from 16.5°C to 16.58°C with the calefacient effect of the rainwater. After the rise of the water temperature, the air temperature rose by 0.5 degree, the lag between them depend on the amount of rainfall. The carbon sinks of the underground river in Xueyu cave were salient during the storm periods, and the partial pressure of carbon dioxide

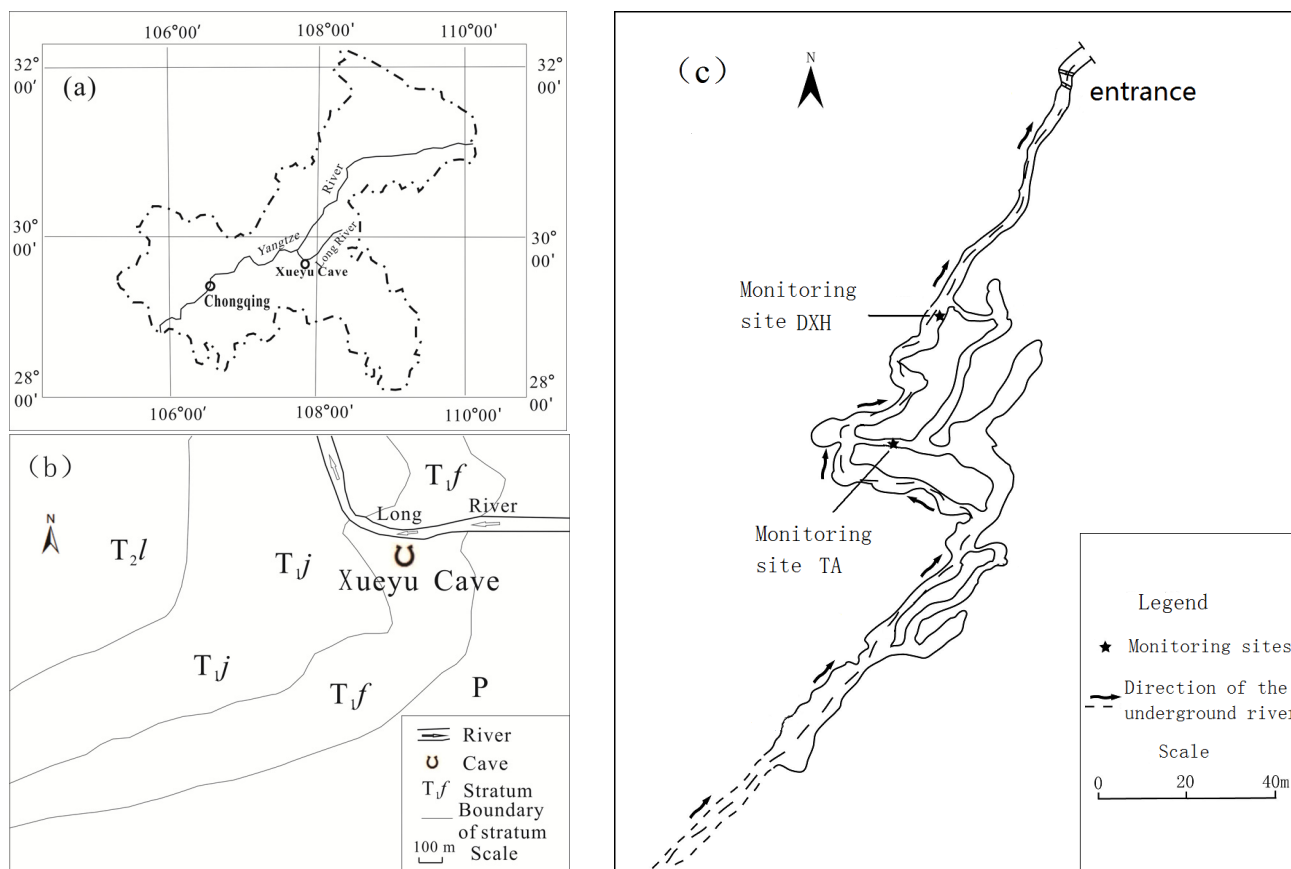


Fig.1 The location (a), geological map (b) and monitoring sites of Xueyu cave (c)

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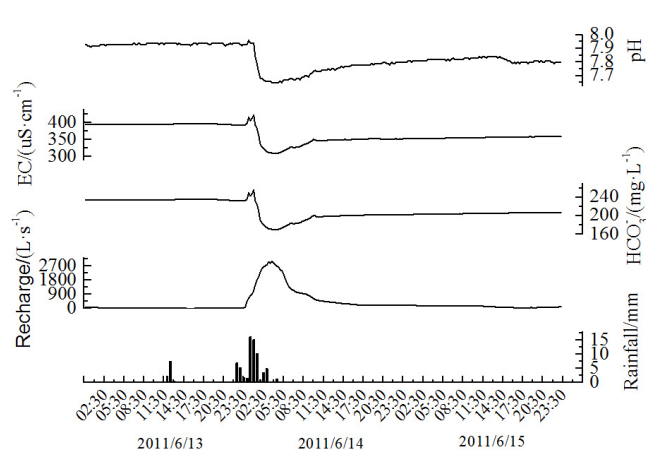


Fig.2 The variations of pH, EC, HCO_3^- , discharge of underground water in Xueyu cave from June 13 to June 15, 2011

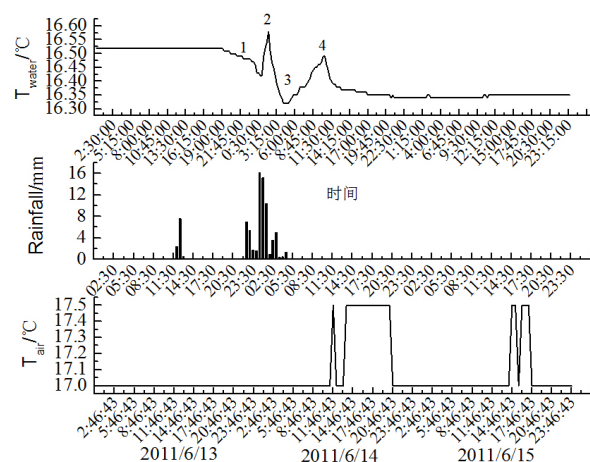


Fig.3 The variations of water temperature and air temperature in Xueyu cave from June 13 to June 15, 2011

rose with the increase of rainfall. The amount of DIC increased by 15191.987 kg and the increase of the absorbed carbon dioxide was 5479.077 kg, so the carbon sinks caused by the increased discharge should be attached more importance.

Key words: rainfall; underground river; hydrology and geochemistry; carbon sinks; Xueyu cave

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