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The characteristics of water-carbon regime of Banzhai karst subterranean stream system covered by virgin forest with soil deficiency

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Three hydrological years' automatic monitoring (from January, 2007 to June, 2010) was made in the discharge area of karst subterranean stream system covered by virgin forest with soil deficiency by use of hydro-chemical auto-recordable instrument to investigate the characteristics of water-carbon regime of discharge from this subterranean stream system. The methods of water balance calculation, karst water discharge recession analysis and stable isotope and hydrochemistry were used. The results show that: first, the evapotranspiration of virgin forest is unexpectedly high, indicated by low infiltration coefficient and low subterranean river runoff generation; second, under the conditions of deficiency of soil cover, even the virgin forest has only moderate ability of regulation and control of hydrological (Q) and hydrochemical (e.g., bicarbonate concentration) processes, so that the karstification intensity and the relevant carbon sink capacity keep low. These characteristics reflect that soil cover plays important roles in the regulation and control of water resources and carbon cycle.