



## Study of the hydrodynamic characteristics of hillslope epikarst zone by means of combined time series analysis and field investigation

Z.-c. Zhang

Hohai, Nanjing, China (zhangzhicai\_0@hhu.edu.cn)

Study of the hydrodynamic characteristics of hillslope epikarst zone by means of combined time series analysis and field investigation

Zhi-cai Zhang, Xi Chen, Peng Shi

State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering, Hohai University, Nanjing 210098, China, 86-02583786981, zhangzhicai\_0@hhu.edu.cn

The karst fracture network in the shallow layer of rock is connected and infiltrated water flows out in a lower area of hillslope. Spring discharge from epikarst zone is an important groundwater resource in karst areas. It is popularly used for irrigation and in the hilly mountainous areas in the southwest karst region of China, about 73% of the southwest karst center area of Guizhou province, China. The different epikarst spring hydrographs derive from a response to diffuse recharge over the entirely epikarst network. As a useful method, time series analysis is widely used in karst hydrogeology. However, some literatures indicated that it is essential that the results of a time series analysis be interpreted together with the results of other methods used in karst hydrology. In this study, time series analysis method combined with field investigation (including fracture investigation in section and Ground Penetrating Radar (GPR) investigation) have been used to study characteristics of karstic spring hydrograph. Two hillslopes on adjacent mountains located in a small karst basin of Chenqi in the Puding Karst Ecohydrological Observation Station, Guizhou province of China was selected for this study. Ground Penetrating Radar method was used for epikarst thickness investigation. And based on time series analysis method applied to the springs located in study hillslopes, hydrological parameters of epikarst zone with different thickness in two test hillslopes, such as memory effect, response time and the mean delay have been identified. Based on the results of the time series analysis, we can conclude that the study hillslopes the two springs located in respectively have well organized and highly developed epikarst zone. The difference of thickness results in difference of storage and water flow path. Because of the larger storage space, the thicker epikarst zone with stronger adjustability has a laggardly hydrograph pattern. At meantime, more horizontal flow within thicker epikarst zone will via small fracture with low conductivity in lower zone, especially in initial time of precipitation, and which resulting the short regulation time and memory stronger effect.