Geophysical Research Abstracts
Vol. 21, EGU2019-11759-2, 2019
EGU General Assembly 2019

Characterizing the water residence time of different runoff components for rainfall-runoff events in Hydrohill experimental catchment

Na Yang, Jianyun Zhang, Jiufu Liu, and Weizu Gu

Nanjing Hydraulic Research Institute, Hydrology and Water Resources Department, Nanjing, China (nayang89@outlook.com)

Distribution of residence time has been commonly used to characterize the response catchment runoff processes. Most previous studies on water residence time have been mainly focused on large scale analysis in time and space and on estimating residence time distribution of total runoff. In this study, we analyzed residence time distribution (RTD) of different runoff components at event scale in Hydrohill experimental catchment, which is located in Chuzhou City, Anhui Province, China. Hydrochemical and isotopic data, i.e., ^{18}O, D, anions (HCO_3^-, Cl^-, NO_3^-, SO_4^{2-} and F^-), cations (K^+, Na^+, Ca^{2+} and Mg^{2+}) and dissolved Si in water samples were collected during the rainfall events in 2016, which are used to characterize the response of different runoff components by combining lumped parameter models. Results showed that ^{18}O and Cl^- are the most suitable indicators to evaluate RTD of runoff components. On the experimental catchment scale, groundwater runoff gets the longest residence rime among all three runoff components. Residence rime of interflow runoff is approximately 1.38 times longer than that of surface runoff. Hydro-chemical tracing provide an effective way to easily measure and understanding hydrological processes for critical zone, which could support hydrological model development by strengthening physical base of hydrological cycle. However, what caused difference in residence time of runoff components and how to quantify interaction between different runoff components should be enhanced in further study.

Key words: water residence time; runoff components; lumped parameter models; hydro-chemical and isotopic data; Hydrohill experimental catchment

Acknowledgements: The work has been supported by National Natural Science Foundation of China (Grant No. 41830863) and National Key Research and Development Programs of China (Grant No. 2016YFA0601501)