

## Exploring the factors responsible for variation in streamflow using different Budyko–base functions

Sabab Ali Shah\*, Muhammad Jehanzaib\*\*, Min Ji Kim\*\*\*, Tae–Woong Kim\*\*\*\*

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### Abstract

Recently an accurate quantification of streamflow under various climatological and anthropogenic factors and separation of their relative contribution remains challenging, because variation in streamflow may result in hydrological disasters. In this study, we evaluated the factors responsible for variation in streamflow in Korean watersheds, quantified separately their contribution using different Budyko–based functions, and identified hydrological breakpoint points. After detecting that the hydrological break point in 1995 and time series were divided into natural period (1966–1995), and disturbed period (1996–2014). During the natural period variation in climate tended to increase change in streamflow. However, in the disturbed period both climate variation and anthropogenic activities tended to increase streamflow variation in the watershed. Subsequently, the findings acquired from different Budyko–based functions were observed sensitive to selection of function. The variation in streamflow was observed in the response of change in climatic parameters ranging 46 to 75% (average 60%). The effects of anthropogenic activities were observed less compared to climate variation accounts 25 to 54% (average 40%). Furthermore, the relative contribution was observed to be sensitive corresponding to Budyko–based functions utilized. Moreover, relative impacts of both factors have capability to enhance uncertainty in the management of water resources. Thus, this knowledge would be essential for the implementation of water management spatial and temporal scale to reduce the risk of hydrological disasters in the watershed.

**Keywords :** Streamflow Variability; Hydrological Break Point; Budyko–base Functions; Anthropogenic Activities; Climate Variability.

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\* Post-Doctoral Researcher, Research Institute of Engineering and Technology, Hanyang University (ERICA) · E-mail : [sayedsabab@hanyang.ac.kr](mailto:sayedsabab@hanyang.ac.kr)

\*\* Post-Doctoral Researcher, Research Institute of Engineering and Technology, Hanyang University (ERICA) : [jehanzaib7@hanyang.ac.kr](mailto:jehanzaib7@hanyang.ac.kr)

\*\*\* Member · Graduate Student, Dept. of Smart City Engineering, Hanyang University : [stylus97@hanyang.ac.kr](mailto:stylus97@hanyang.ac.kr)

\*\*\*\* Member · Professor, Dept. of Civil and Environmental Engineering, Hanyang University (ERICA) : [twkim72@hanyang.ac.kr](mailto:twkim72@hanyang.ac.kr) (Corresponding Author)