Historical changing of flow characteristics over Asian river basins

Doan Thi Thu Ha*, Tae-Son Kim**, Deg-Hyo Bae***

Abstract

This study investigates the change of flow characteristics over 10 Asian river basins in the past 30 years (1976-2005). The variation is estimated from The Soil and Water Assessment Tool (SWAT) model outputs based on reanalysis data which was bias-corrected for Asian monsoon reagion. The model was firstly calibrated and validated using observed data for daily streamflow. Four statistical criteria were applied to evaluate the model performance, including Coefficient of determination (R2), Nash - Sutcliffe model efficiency coeffi cient (NSE), Root mean square error-observations standard deviation ratio (RSR), and Percentage Bias (PBIAS). Then parameters of the model were applied for the historical period 1976-2005. The estimates show a temporal non-considerable increasing rate of daily streamflow in most of the basins over the past 30 years. The difference of monthly discharge becomes more significant during the months in the wet season (June to September) in all basins. The seasonal runoff shows significant difference in Summer and Autumn, when the rainfall intensity is higher. The line showing averaged runoff/rainfall ratio in all basins is sharp, presenting high variation of seasonal runoff/rainfall ratio from season to season.

Keywords : SWAT Model, Climate Change, Streamflow, Flow Characteristics, Asian Basin, Reanalysis Data;

Acknowledgements

This work was supported by KOREA HYDRO & NUCLEAR POWER CO., LTD. (No. H18S023000)

* Member · PhD student, Dept. of Civil and Environ. Eng., Sejong University· · E-mail : hadoanbk@gmail.com

** Member · Senior Manager, Hangang Hydro Power Site, KHNP Co., LTD · · E-mail : aquarisleo@khnp.co.kr

*** Member · Professor, Dept. of Civil and Environ. Eng., Sejong University· · E-mail : dhbae@sejong.ac.kr