

The Evaluation of Impact of Drought Resulted from the Climate Change in South Korea - Case Study on the Han-River Basin

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Abstract. Global climate change has brought significant changes in hydrological environment. Those changes also have occurred in the Korea peninsular for the last several decades, increasing the magnitude of damage by droughts and floods.

As an attempt to explore the impact of droughts which may be made worse by the climate change, we analyze the change in the water balance of the Han-river basin. To accomplish it, we suggest a procedure consisting of three successive sub-procedures: daily rainfall generation for 90 years by the RegCM3 with the A2 scenario, daily discharge simulations by SLURP using the generated daily rainfall data, and monthly water balance analysis by K-WEAP (Korean Water Evaluation and Planning System) based on the SLURP simulation. Since significant uncertainty is involved in forecasting the future water consumption and water yields, we assumed three water consumption scenarios and three water yields scenarios. Three water consumption scenarios are, namely, "LOW", "MEDIUM", and "HIGH" according to the expected amount of water consumption. The fifty daily discharges are obtained from the SLURP simulations during the drought period. To improve the representability of possible daily rainfall events, fifty sets of daily rainfall data for 90 years are generated and then each set is used as an input for the SLURP simulation. Finally, water balance analysis is performed by K-WEAP based on 150 combinations from three water consumption scenarios and the fifty daily discharges. Additionally, we estimated the impact of climate change by modified water scarcity index.

By these procedures, it is possible to explore various water consumption and water yield scenarios and the results of this study can be used to establish appropriate plans for minimizing the impact of drought resulted from the climate change in Korean peninsula.

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