Simulation and validation of flash flood in the head-water catchments of the Geum river basin

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Abstract

Flash floods are one of the types of natural hazards which has severe consequences. Flash floods cause high mortality, about 5,000 deaths a year worldwide. Flash floods usually occur in mountainous areas in conditions where the soil is highly saturated and also when heavy rainfall happens in a short period of time. The magnitude of a flash flood depends on several natural and human factors, including: rainfall duration and intensity, antecedent soil moisture conditions, land cover, soil type, watershed characteristics, land use. Among these rainfall intensity and antecedent soil moisture, play the most important roles, respectively. Flash Flood Guidance is the amount of rainfall of a given duration over a small stream basin needed to create minor flooding (bank-full) conditions at the outlet of the stream basin. In this study, the Sejong University Rainfall-Runoff model (SURR model) was used to calculate soil moisture along with FFG in order to identify flash flood events for the Geum basin. The division of Geum river basin led to 177 head-water catchments, with an average of 38 km^2. the soil moisture of head-water catchments is considered the same as sub-basin. The study has measured the threshold of flash flood generation by GIUH method. Finally, the flash flood events were used for verification of FFG. The results of the validation of seven past independent events of flash flood events are very satisfying.

Keywords : Flash flood, Threshold runoff, FFG, SURR model

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