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Development of simple distributed hydrological model based on soil moisture simulation

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One of challenges to hydrologists is to estimate runoff from ungauged watershed. Hydrologic estimation through modelling is a reasonable, economical and useful approach to quantity and quality management of watershed. The model framework has been comprehensive and complex to reproduce natural phenomena more realistically with the development of computer hardware. However, driving a complex model requires a lot of effort and time, and the use of many parameters reduces the accessibility of end users and the applicability to the ungauged watershed. In this study, we developed a distributed hydrologic model based on soil moisture simulation using simple composition and fewer parameters. Instead of minimizing the number of parameters, GIS data were used to reflect the watershed characteristics into the model. The proposed model was applied to the four dam watersheds in Korea to assess its performance. As a result, it is confirmed that reasonable hydrologic components simulation is possible through the simulation of soil moisture, even though it was a simple model with only three input parameters. If spatial data such as satellite data is additionally applied, the performance of the model is expected to improve further.

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Keywords: Distributed hydrological model; Hydrologic components simulation; Soil moisture; Simple hydrological model.