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Development of integrated urban discharge forecasting model using global climate prediction data: A case study of the Ui-Cheon basin, South Korea

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In this study, we developed real-time urban stream discharge forecasting system using short-term rainfall forecasts data simulated by a regional climate model. The National Centers for Environmental Prediction (NCEP) Climate Forecasting System (CFS) data was used as a boundary condition of regional climate model, which is the Global/Regional Integrated Model System (GRIMs)-Regional Model Program (RMP). And we make ensemble (ESB) forecast with different lead time for 1-day to 3-day and we assessed its accuracy through temporal correlation coefficient (TCC). The simulated rainfall is compared to observed data sets, which are automatic weather system (AWS) point data and Tropical Rainfall Measuring Mission (TRMM) Multisatellite Precipitation Analysis (TMPA 3B43; 3 hourly rainfall with $0.25^\circ \times 0.25^\circ$ resolution) data over midland of Korea in July 26-29, 2011. Moreover, we analyzed urban rainfall-runoff using Storm Water Management Model (SWMM). Several statistical methods (such as percent error of peak, volume, and time of peak) are used for rainfall-runoff model assessment between observed and forecasted discharge. We assessed the correlation coefficient (CC) and the Nash-Sutcliffe efficiency (NSE) between observed and forecasted discharge. The CC is highly correlated among LT-33, LT-27, and ESB forecasts. And also the NSE has positive values in LT-33 and ESB forecasts. Through this study, we carried out there is a possibility for real-time urban flood forecasting using this coupled urban discharge forecasting system and expect to using flood early warning system.

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