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An Impact Assessment of Climate and Landuse Change on Water Resources in the Han River, South Korea

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As climate changes and abnormal climates have drawn research interest recently, many countries utilize the GCM, which is based on SRES suggested by IPCC, to obtain more accurate forecast for future climate changes. Especially, many research attempts have been made to simulate localized geographical characteristics by using RCM with the high resolution data globally. To assess the impacts of climate and landuse change on water resources in the Han-river basin, we carried out the procedure consisting of the CA-Markov Chain, the Multi-Regression equation using two independent variables of temperature and rainfall, the downscaling technique based on the RegCM3 RCM, and SLURP. From the CA-Markov Chain, the future landuse change is predicted and the future NDVI is predicted by the Multi-Regression equation. Also, RegCM3 RCM 50 sets were generated by the downscaling technique based on the RegCM3 RCM provided by KMA. With them, 90 year runoff scenarios whose period is from 2001 to 2090 are simulated for the Han-river basin by SLURP. Finally, the 90-year simulated monthly runoffs are compared with the historical monthly runoffs for each dam in the basin. At Paldang dam, the runoffs in September show higher increase than the ones in August which is due to the change of rainfall pattern in future. Additionally, after exploring the impact of the climate change on the structure of water circulation, we find that water management will become more difficult by the changes in the water circulation factors such as precipitation, evaporation, transpiration, and runoff in the Han-river basin