The Effect of Climate Change on Water Quality in a Dammed River Basin

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Recently, weather variation and abnormal weather phenomena such as desertification, Typhoon and heavy rainfall can be found all around the world due to climate change. This climate change has a huge impact on sustainable water resources management by changing various climate factors. Therefore, to assess the impact of climate change on water quality in an impounded river basin, this study estimated future air temperature and rainfall in the years of 2020, 2050 and 2080 by statistically downscaling the simulation results from two GCM models combined with two emission scenarios (A2 and B1). Both scenarios were selected from the Special Report on Emission Scenarios (SRES) suggested by IPCC. The A2 scenario represents an extreme condition whereas the B1 scenario represents a clean and energy efficient condition which is similar to that of study basin. Under the consideration of long-term time scale, the change in land use was predicted using the Neural Network model. With the results of estimated climate factors and land use data, the discharge and the concentrations of BOD, TN and TP in the Andong and Hapcheon dam basins were simulated using the SWAT model. In addition, the future inflow and water quality according to the construction of the Youngju multipurpose dam were simulated using the reservoir water quality model, which coupled the EFDC and the WASP models, using the rainfall and water temperature data extracted from this study. The change in water quality (BOD, TN and TP) was analyzed for each climate change scenario before and after the construction of the dam.

Keyword : GCM, Downscaling, SWAT, EFDC

References

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