Generating global warming scenarios with probability weighted resampling and its implication in precipitation with nonparametric weather generator

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Abstract

The complex climate system regarding human actions is well represented through global climate models (GCMs). The output from GCMs provides useful information about the rate and magnitude of future climate change. Especially, the temperature variable is most reliable among other GCM outputs. However, hydrological variables (e.g. precipitation) from GCM outputs for future climate change contain too high uncertainty to use in practice. Therefore, we propose a method that simulates temperature variable with increasing in a certain level (e.g. 0.5oC or 1.0oC increase) as a global warming scenario from observed data. In addition, a hydrometeorological variable can be simulated employing block-wise sampling technique associated with the temperature simulation. The proposed method was tested for assessing the future change of the seasonal precipitation in South Korea under global warming scenario. The results illustrate that the proposed method is a good alternative to levy the variation of hydrological variables under global warming condition.

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Key words : Intentionally biased bootstrapping, climate change, global climate model, precipitation, uncertainty

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