

Some issues on the downscaling of global climate simulations to regional scales

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요 지

Downscaling is a fundamental procedure in the assessment of the future climate change impact at regional and watershed scales. Hence, it is important to investigate the spatial variability of the climate conditions that are constructed by various downscaling methods in order to assess whether each method can model the climate conditions at various spatial scales properly.

This study introduces a fundamental research from Jang and Kavvas(2015) that precipitation variability from a popular statistical downscaling method (BCSD) and a dynamical downscaling method (MM5) that is based on the NCAR/NCEP reanalysis data for a historical period and on the CCSM3 GCM A1B emission scenario simulations for a projection period, is investigated by means of some spatial characteristics: a) the normalized standard deviation (NSD), and b) the precipitation change over Northern California region.

From the results of this study it is found that the BCSD method has limitations in projecting future precipitation values since the BCSD-projected precipitation, being based on the interpolated change factors from GCM projected precipitation, does not consider the interactions between GCM outputs and local geomorphological characteristics such as orographic effects and land use/cover patterns.

As such, it is not clear whether the popular BCSD method is suitable for the assessment of the impact of future climate change at regional, watershed and local scales as the future climate will evolve in time and space as a nonlinear system with land-atmosphere feedbacks. However, it is noted that in this study only the BCSD procedure for the statistical downscaling method has been investigated, and the results by other statistical downscaling methods might be different.

Keywords : Climate change, Statistical downscaling, Dynamical downscaling, Precipitation variability

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