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Kriging Approach to Quantile Delta Mapping (QDM) for Spatial Downscaling of Climate Change Scenario

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Rainfall simulation by climate model is generally provided at coarse grids and bias correction is routinely needed for the hydrological applications. This study aims to explore an alternative approach to downscale daily rainfall simulated by the regional climate model (RCM) at any desired grid resolution along with bias correction using a Kriging model, which better represents spatial dependencies of distribution parameters across the watershed. The Kriging model also aims to reproduce the spatial variability observed in the ground rainfall gauge. The proposed model is validated through the entire weather stations in South Korea and climate change scenarios simulated by the five different RCMs informed by two GCMs. The results confirmed that the proposed spatial downscaling model could reproduce the observed rainfall statistics and spatial variability of rainfall. The proposed model further applied to the climate change scenario. A discussion of the potential uses of the mode is offered.

KEYWORDS: Climate Change Scenario, Global Climate Models, Regional Climate Models, Statistical Downscaling, Spatial-Temporal Bias

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