PERFORMANCE OF CLIMATE MODELS IN REPRODUCING THE HYDROLOGICAL CHARACTERISTICS OF RAINFALL EVENTS IN FLORIDA

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Rainfall events largely control hydrological processes occurring on and in the ground, and their characteristics determine the severity and frequency of extreme hydrological events including flood and drought. However, climate models' performance in reproducing rainfall events has not been investigated enough to guide selection among the models when making hydrological projections. We proposed to compare the durations, intensities, and pause periods as well as depths of rainfall events when assessing the accuracy of general circulation models (GCMs) in reproducing the hydrological characteristics of observed rainfall. In this study, rainfall projections made from outputs of 29 Coupled Model Intercomparison Project 5 (CMIP5) GCMs were investigated, and the proposed GCM evaluation method were applied to 78 weather stations located in Florida. This study also compared the sizes of design storm events and the frequency and severity of drought to demonstrate the consequences of GCM selection. Results showed that rainfall and extreme hydrological event projections could significantly vary depending on climate model selection and weather stations, suggesting the need for careful and comprehensive evaluation of GCM in the hydrological analysis of climate change. The proposed GCM evaluation methods are expected to help to select GCMs that can reproduce the rainfall characteristics of local areas and thus improve the accuracy of future hydrological projections for water resources planning.

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